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OF THE

SCIENCE OF ELECTROPLATING

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Publication and Editorial Office
3040 Diversey Ave., Chicago

VOL. XVII APRIL, 1930 No. 4

EDITORIAL

EXPERIENCE

In these days of advancing thought neither producing systems nor industrial methods can remain constant. Systems of yesterday are not those of today. It is the learning of things, the fuller knowing of things, that accounts for the change in the doing of things.

There is no such thing as unrequited mental toil, we are broader and bigger for it regardless of material consequence. Experience is a great school. Some learn much from experience, others little; the difference is a personal matter. Possibly you don't like the business of plating. Perhaps you did not choose it, just drifted in or was sort o' forced in and have always imagined yourself a better something else. If you don't like, can't make yourself like the business, one thing is sure, you will take but little enjoyment out of your daily experience, while the man who delights in daily contact with new problems will go after a new idea as voraciously as a hungry infant grabs for a rubber teat. Nothing spurs a man to greater effort than honest contention, but don't argue for the sake of appearing clever. Our Branch meetings furnish splendid opportunity for honest contention and exchange of opinions. Are you a regular attendant? The society needs you, you need the society, it's a mutual affair so there is no argument over that point. Experience is the sum total of small affairs and the best way to cash in on the sum total is to attend the annual convention. There you will meet the best and broadest men of the electroplating industry. "Believe it or not" it will broaden you to hear them talk. The opportunity is yours, if you neglect it you play a losing game. It's an inspiring, broadening experience and you can't afford to miss it.

Get out and see what others are doing, it's a poor plating plant

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that possesses no individuality and a poor plater without a notion or two of his own. A narrow man stays at home and thinks he knows it all. A broad minded man gets out and sees what is going on in other shops and the firm that denies its foreman plater this pleasure at least once each year is "durned small pertaters."

Never be ashamed to ask for information, it will aid in rounding out your experience, but be ashamed of your indifference toward the attainment of practical knowledge. And above all,—BE GENEROUS WITH YOUR EXPERIENCE, LEND A HELPING HAND WHENEVER YOU CAN, IF YOU HOPE TO EXPERIENCE GENUINE SATISFACTION.

EXECUTIVE BOARD MEETING—MARCH 21, 1930

The Executive Board met in session at the Powers Hotel, Rochester, New York, on Friday, March 21st, 1930, with President Smith, 2nd Vice President Kennedy, Past President Feeley, Editor Hanlon and Secretary-treasurer Gehling, present.

First Vice President Van Derau telephoned, business at his plant was such, that he regrets he cannot be present.

Minutes of the Board were read, and it was recommended that the words "Research Committee" be stricken out on the vote of December 1st, 1929. Carried.

Mr. Geo. B. Hogaboom read his report of the "Incorporation Committee," as follows:

Dear Mr. President:

Directly after the convention of the A. E. S. in Detroit, July, 1929, you requested me to arrange to have the A. E. S. incorporated.

A thorough investigation was made of the incorporation laws of New York, New Jersey; with the aid of a very competent lawyer, it was claimed that organizations which have a ruling body, such as our Supreme Society, always have a constitution to rule the whole organization and by-laws to govern subordinate bodies, such for example as our Branch societies.

The A. E. S. has two constitutions, one for the Supreme Society of ruling body; and one for the subordinate bodies, the Branch societies, there are no by-laws.

The opinion obtained is that it would be well for the A. E. S. to have one constitution and a set of by-laws.

This change cannot be made by me and as I am not a member of the Supreme Society, I cannot serve upon such a committee.

I am also of the opinion that you cannot appoint a committee to make this change, this authority to do so would have to be given you at a convention of the Supreme Society, this was not done at Detroit.

I recommend that the reconstruction of the A. E. S. constitution be brought before the A. E. S. convention at Washington, D. C., July, 1930, and that a committee be appointed, if the Society so votes, to make the necessary changes, this committee to report at the 1931 convention.

It is realized that this procedure causes a long delay in incorporating the A. E. S., but there is no other way that would be in accordance with the present constitution.

I would be pleased to serve as an adviser to a committee and offer the advantage of my experience in performing the work you assigned me.

Geo. B. Hogaboom.

Motion made the committee get a lawyer to draft constitution and by-laws so that the society can be incorporated and the same to be ready for presentation to the Washington convention. Carried.

Mr. Philip Sievering reported as treasurer of the Research Committee as follows:

Receipts

June 1st, 1929, to March 21st, 1930.....	$1160.21	
June 1st, 1929, balance on hand.....	4539.35	
	$5699.56	$5699.56

Disbursements

June 1st, 1929, to March 21st, 1930.....	$3375.43
Balance on hand	$2324.13

On the above receipts $675.00 is paid on the 1930 campaign.

Philip Sievering,
Treasurer of Research Committee.

Motion made report be received. Carried.

Mr. Geo. Hogaboom reported for the Membership Committee and stated he sent out 3,600 letters and intends to send out 1,500

more, and this expense was being borne by him as his contribution to the Society.

The Metal Industry has donated to the Society one full page in both the Metal Industry and the Brass World, for advertising for the committee, to run for six months beginning January 1st, 1930.

Motion made progress report be received. Carried.

Secretary Gehling reported the inactivity of the Cincinnati Branch, as the branch was not holding meetings and had not paid any P. C. T. for the past nine months.

It was suggested that Secretary Gehling notify all members of the Cincinnati branch of the laxity of their branch and asking them for suggestions and their opinions as to the best way to have the branch function again. Carried.

After discussing a letter received by the President from one of the branches, the following resolution was read:

We the Executive Board in session March 21st, 1930, offer to the Supreme Society in annual convention at Washington, D. C., the following resolution:

That in view of the continued desire of many branches to sell advertising or solicit funds for annual meetings and banquets, we the Executive Board, respectfully request to save future executive boards embarrassment, that Sec. 3, Article XII, be stricken from our constitution. Carried.

Secretary was authorized to get new charters printed for the Dayton, Detroit, Montreal and Newark branches. Carried.

The following tentative plan towards zoning the branches was adopted by the Executive Board and the same to be placed before the Washington convention:

The location of the branches are such that it calls for nine zones, so as not to have the vice-presidents traveling too long a distance to get to the branch meetings in their zones.

Instead of calling the vice-presidents, i. e., first vice-president, second vice-president, etc., their title should be vice-president of zone one, and zone two, etc.

All vice-presidents should be members of the Executive Board together with the president, secretary-treasurer, editor, and the past president.

All vice-presidents shall keep a record of the progress of the branches in their respective zones, and see that the branches meet

regularly, and make a report of the same to the Executive Board prior to the annual meeting or convention, so that the same can be reported at the convention.

Zones

1—St. Louis, Indianapolis, Cincinnati, Dayton.
2—Chicago, Milwaukee, Grand Rapids.
3—Toledo, Cleveland, Pittsburgh.
4—Montreal, Toronto.
5—New York, Newark, Philadelphia, Baltimore-Washington.
6—Rochester, Detroit.
7—Boston, Worcester, Providence.
8—Bridgeport, Waterbury, Hartford-Connecticut Valley.
9—Los Angeles.

Carried.

The following letter was read from the Metal Industry:

To the Executive Officers, A. E. S.

Gentlemen:

Referring to the Rochester meeting.

It is our desire to cover this meeting, as we have all other similar meetings, but find that it is a hard matter to go into the meeting in detail without being able to refer to the discussion.

We enclose a copy of the editorial covering the Newark meeting in 1929, and we should like to hear if you will grant us permission to cover the Rochester meeting by referring to the papers read and the discussions.

Yours truly,

The Metal Industry.

After discussing the letter, it was the sense of the Executive Board, that we appreciate the courtesy of the Metal Industry in asking for the privilege of reporting the Rochester meeting, and recommend that they cooperate with the editor of the "Monthly Review," Mr. Frank Hanlon, in reference to the same. Carried.

Meeting was adjourned at the call of the President.

Geo. Gehling, Secretary.

MODERN METHODS OF CLEANING METALS FOR CHROMIUM PLATING AND THE FUTURE OF CHROMIUM PLATING

Jacob Hay, Detroit, Michigan

Read at St. Louis Branch, 18th Annual Meeting

With so much written and published about the cleaning of metals for all kinds of plating it seems that there is very little to say about cleaning metals for chromium plating.

About five years ago when we first heard about chromium plating, our organization was approached by a certain company to chromium plate the reflectors for Mining Head Light Reflectors, the type that miners use in coal mines and so forth.

Some time later chromium plating was specified on such parts as automobile head lamps, fender lamps and cowell lamp brackets and later on reflectors.

Chromium plating was practically new to the platers and therefore countless troubles were experienced in its commercial application.

Everything seemed to work out all right in a laboratory scale, but when we started on a large production basis it appeared at once that the Electro-Plater had to learn the art of plating all over again.

Better methods of polishing of base metals, cleaning, closer control of copper, nickel and chromium solutions and buffing of metallic coatings had to be maintained in order to obtain a finish that would be passed by our inspection department.

Minute scratches, either in the base metal or metallic deposits, that had been left there by the polishers and buffers and also particles that were carried over by the electro-cleaning solution would be highly magnified by the highly reflective chromium finish.

One can readily perceive the number of obstacles which we had to overcome. These troubles were not confined to our organization alone. No one contemplating chromium plating escaped trouble.

Many of you have noticed that chromium and nickel plates have had some parts peel that have only been in use a short time, and that some nickel plating peels the minute you try to chromium plate the same.

This is due in most cases to improper cleaning and deoxidizing the base metal surface prior to plating.

Head lamps or fender brackets have, in many cases, shown the brass base in a very short time. This is caused by either extremely thin deposits of nickel or an abundance of hydrogen bound gas which was absorbed by the pores of the nickel plate during the electro-deposition of the chromium.

Most of these troubles were experienced by us about a year ago when the automobile manufacturers to whom we furnished lamps received complaints from customers about the chromium finish on their cars. Some of the vendors were not prepared to do justice to the class of work that should have been furnished to the public in order to withstand corrosion, and at the same time satisfy the production schedule demanded. Most of them had to learn chromium plating all over again, the same as we had to do five years before. We fortified ourselves against these troubles by spending time and money to develop a chromium finish that would stand up under the most severe test that could be given our product. Some of the complaints were justified but most of the complaints were unjustified.

This, I believe, was largely responsible for the advertising propaganda issued in various trade journals that chromium plate finish would resist wear, tarnish, corrosion and what not. The public, reading of this, or hearing of it, immediately began noticing defects of a minor nature on their newly chromium plated decorative automobile parts.

Head lamps, fender lamps and brackets get the most severe test of all automobile parts by the inspectors.

In our line of manufacturing we have only four metals to contend with as far as the plating, polishing and buffing department is concerned.

I will try to explain, step by step, the method we employ in finishing the same.

In polishing and buffing we use a buffing composition with not more than 5 per cent petrolatum. After the metals have been cut down with tripoli on the automatic buffing machines or otherwise, and all buffing machine work and stamping have been completed, the finished parts are cleaned in a washing machine to remove all tripoli and grease left on the surface of the metal by the preceding operations. The parts should then be buffed with a lime compo-

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sition of high quality. Brass parts are then ready for the final cleaning before nickel plating.

I will not go into any detail to explain the action of different chemicals and emulsifiers that are used. Any one of you that is seeking that information can find the same in "Principles of Electro-Plating and Electro-Forming by Blum and Hogaboom." They have a very good article on the subject.

We use a cleaner made up of soda ash, trisodium phosphate, sodium silicate, rosenate and a very little caustic soda. A fuse cleaner is to be preferred. We find that the temperature closely controlled in operating a cleaning solution is one hundred per cent of our success, as the temperature has a very marged effect on the alkalinite of the cleaners.

The following method is used in our cleaning cycle: Semi-Automatic cleaning machine, moving cathode, cleaning time one and one-quarter minute, temperature of the cleaning solution 200 degrees Fabrenheit, 12 volts used in the cleaner, and the brass parts made the cathode. Then into a second cleaner consisting of nothing else but soda ash, two ounces per gallon of water; the parts to be cleaned are made the anode for two seconds; the temperature of this cleaner should be maintained at 150 degrees Fahrenheit; voltage is 12 volts.

The following rinse methods are used from cleaner: Water rinse, cyanide dip, water rinse, acid dip consisting of 20 per cent hydrofluoric acid, water rinse, nickel solution of the following composition:

32 ounces nickel sulphate
11 ounces nickel chloride
4 ounces boric acid
2 ounces sodium sulphate

This solution is maintained at temperature of 120 degrees Fahrenheit, P. H. 5.9, metal content not lower than 6 ounces per gallon, nickel chloride content, 10 to 11 ounces per gallon.

We plate our head lamps 13 minutes at 30 amperes per square foot. This gives us a deposit of three-ten-thousandths of an inch of nickel. This amount of nickel is very essential for a good substantial chromium finish.

In preparing zinc die castings for nickel and chromium plating our procedure is the same as for brass, with only two exceptions: we do not use the second cleaner with the soda ash and the re-

verse current, and after dipping the zinc castings in hydrofluoric acid we go direct into the nickel solution without rinsing in water. The nickel solution here used is:

10 ounces nickel sulphate
2 onuces ammonia chloride
3 ounces boric acid
24 ounces sodium sulphate
1 gallon water

P. H. from 5.9 to 6.1, temperature 80 degrees Fahrenheit.

We clean steel parts in washing machine, cyanide copper plate, nickel plate, acid copper plate, copper buff, nickel plate again and nickel buff.

All told we get about eight ten-thousandths of an inch of metal on our steel parts, not counting the chromium.

In plating aluminum, though we do very little work on aluminum, we follow Dr. Work's method.

All our metal parts are plated on plating hooks under spring tension and operators on the racking of the parts all wear rubber gloves so as not to touch the buffed parts with their bare hands.

After nickel plating the parts are nickel colored. We use care to get the best nickel color obtainable. The nickel buffers usually have two wheels, one to cut down and one to color the nickel. By this method, they get a very good color on the nickel. It also helps in the final cleaning of the nickel buffed parts.

When we first started cleaning nickel plated parts for chromium plating I never realized how much trouble there was in it. I do not believe there was a cleaning expert in the country that I did not consult about the problem of cleaning nickel before chromium plating. Everyone of them failed me. On a visit to Chicago I had a long talk with our old friend, Dad Liscomp, whom you all know. He advanced a theory to me. He said, "Why not try cyanide in the cleaner?"

When I got back to Detroit, I tried cyanide and, believe me, we had some fun! Things were worse than ever. But the fact that I had faith in Dad Liscomp got me to thinking and I tried cyanide alone, cyanide with the cleaner in different strengths and cyanide after cleaning. It went from bad to worse. In despair I tried cyanide cleaner water rinse and alkaline cleaner. The results were very favorable. At the present time I am using the following lineup with success:

1 gallon water

4 ounces sodium cyanide
2 ounces caustic soda

The temperature should be 200 degrees Fahrenheit, 7 volts pressure, cleaning time: 2 seconds, water rinse, then into a cleaner of soda ash trisodium phosphate and caustic soda and silicate of soda. This cleaner does not contain any rosenate or soaps of any kind. The temperature of this cleaner must be thermostatically controlled or else there will be many failures. From this point on the following cycle of rinses is recommended: water rinse, acid dip consisting of muriatic acid and water, the strength of the acid should be from 8 to 9 beaume on the hydrometer, water rinse, cyanide dip with 14 beaume on the hydrometer, water spray, and chromium acid bath for chromium plating. At this point, many of you will ask, "Why clean the nickel for chromium plating?" I consider it the best thing to do and think it ought to be done whenever a finish of high quality is required.

But, gentlemen, I will try to explain with these slides, that I am going to show here, that chromium plating can be done without cleaning and that it is sometimes necessary to chromium plate without cleaning. Cleaning may interfere with the chromium plating.

For instance we have four chromium solutions of 1200 gallons each. Each of them is operated with a different ratio of sulphate content. We try to maintain the same chromic acid content in all of the solutions.

CHROMIUM TANK NO. 1

Date	Content of H_2SO_4	Density of CrO_3	Oz. per gal. CrO_3	Ratio of CrO_3 to H_2SO_4
Sept. 14	.30	24.17	38.06	126
Sept. 21	.32	23.15	36.04	112
Sept. 29	.31	23.15	36.04	116
Nov. 6	.33	23.15	36.04	109
Nov. 13	.30	23.15	36.04	126
Nov. 20	.28	23.15	36.04	128
Nov. 27	.34	26.15	42.03	123
Dec. 4	.24	23.15	36.04	150

Tank No. 1 would give a very good chromium deposit from ratio 112 to 130; above 130 it would plate cloudy and rough; below 110 it has no throwing power.

CHROMIUM TANK NO. 2

Date	Content of H_2SO_4	Density of CrO_3	Oz. per gal. CrO_3	Ratio of CrO_3 to H_2SO_4
Sept. 14	.24	23.15	36.4	150
Sept. 21	.32	23.15	36.4	113
Sept. 29	.31	23.15	36.4	117
Nov. 6	.33	24.17	38.6	116
Nov. 13	.34	26.15	42.3	124
Nov. 20	.32	26.15	42.3	132
Nov. 27	.42	25.17	40.3	95
Dec. 4	.32	25.17	40.3	125

Head Lamp Bodies.

CHROMIUM TANK NO. 3

Date	Content of H_2SO_4	Density of CrO_3	Oz. per gal. CrO_3	Ratio of CrO_3 to H_2SO_4
Sept. 14	.30	22.12	34.4	113
Sept. 21	.32	22.12	34.4	107
Sept. 29	.29	22.12	34.4	118
Nov. 6	.26	24.17	38.6	147
Nov. 13	.31	24.17	38.6	124
Nov. 20	.30	22.12	34.4	114
Nov. 27	.30	22.12	34.4	114
Dec. 4	.30	22.12	34.4	114

Small Side Lamps.

CHROMIUM TANK NO. 4

Date	Content of H_2SO_4	Density of CrO_3	Oz. per gal. CrO_3	Ratio of CrO_3 to H_2SO_4
Sept. 14	.41	24.17	38.6	94
Sept. 21	.40	23.15	36.4	91
Sept. 29	.47	23.15	36.4	77
Nov. 6	.46	25.17	40.3	87
Nov. 13	.62	27.11	44.2	71
Nov. 20	.52	25.17	40.3	77
Nov. 27	.52	25.17	40.3	77
Dec. 4	.47	23.15	36.4	77

H_2SO_4 is kept very high as we plate parts in this solution that we can not clean.

12 volts are used for this solution.

In noting the many valuable properties which chrome plate possesses many harbor the impression that the finish as applied to decorative parts will even withstand the diamond scratch test.

This belief is erroneous, for when we consider the thickness of chromium as applied for instance over our highly buffed nickel plated parts, such as head lamps, as being only .00002, it will be clearly seen that the plating may be scratched with an ordinary steel pin.

However, chrome deposits may be plated sufficiently hard to resist the action of a file or of machining by plating to the thickness of .001 or more. It has been found that the degrees of hardness on various thicknesses of chrome plate as compared with heat treated steels may be obtained by a scratch test using a sapphire jewel and then measuring the width of the scratch in microus a few examples may be illustrated at this point:

	Width of scratch in microus
1—Chrome deposit .01968 Plated on	2.09
2—Chrome deposit .00669 base metal	2.00
3—Chrome deposit .00047 Deposited on hard steel	1.68
4—Hardened high carbon chrome steel	2.30
5—Hardened nitrallo steel	2.03
6—Cyanide steel	2.60
7—Electro-deposited nickel	3.74

So it will be noted from these figures illustrated that the hardness of the base metal upon which the chromium is deposited plays quite an important part. Many of the factory plug gauges are salvaged by chrome plating directly over the hardened steel from an economical standpoint as the gauges when treated in this manner will give from 10 to 20 times the service of ordinary hardened steel. So much for hard chrome plate.

Let us revert for a moment on chrome plating as used on decorative parts and its future. This paper would be incomplete at this time if mention was not made of the use of stainless steel as a substitute for chrome plate finishes. Many of you, no doubt, know that automobile manufacturers have already released for production stainless steel for such parts as hood top hinges and body mouldings displacing the brass base nickel-chrome plate finish. The properties of stainless steel are very similar to chrome plate largely due to the presence of a high percentage of chromium which is incorporated into the steel at the time of manufacture. In order to produce a surface on stainless steel which will resist corrosion and the weather elements it is absolutely necessary that the metal be polished carefully, as small particles of scale on the surface of chrom-iron will induce a difference of potential which results in pitting. The difference in appearance of a highly polished piece of stainless steel as compared with chrome plate is very small, and would not be noticed by the average layman. The chief reason for the enthusiasm displayed for stainless steel at this time, it is believed to be due to the fact that the steel companies manufacturing this wonderful non-corrosive metal have increased their production the past three years, which has resulted in a price reduction of approximately forty per cent, making it attractive for the engineers to consider in it price competition with chromium plating as there will be no necessity to plate stainless steel.

It may be interesting at this time to make mention that the new Chrysler office building is being equipped quite extensively with stainless steel. The lofty tower, a large portion of the exterior architectural metal decoration, store fronts and casement windows of the lower floor, and for interior ornamental metal work. These points are mentioned here merely to show the interest awakened in stainless steel the past six months. There are other decorative automotive parts where the use of stainless steels at the present

time would be prohibitive, such as bumper bars, head lamp tie rods and radiator shells. This is due to factors such as too high a scrap loss, difficulties in fabrication and polishing costs, although automatic polishing machines have been designed lately to take care of some of the high cost of polishing this material.

Summarizing what has been said and done on chromium plating its future will depend on the type of work furnished by those engaged in the art and the cost in producing a finish in competition with some of the newer metals which have been developed and introduced to the metal trade.

REPORT OF ELECTROPLATING CONFERENCE HELD AT ROCHESTER, N. Y., MARCH 22, 1930

For several years conferences on electroplating problems have been held under the auspices of the American Electroplaters' Society and the Bureau of Standards. These were held in Washington until 1929, when the meeting was held in Newark. This year the conference was held in Rochester, N. Y., and was well attended.

A—Sylvester Gartland Presiding

The first session was devoted to industrial plating problems.

1. *Automobiles.*—W. M. Phillips of the General Motors Corporation, reported that, partly as a result of the competition with stainless steel, the total thickness of copper and nickel plated on steel prior to chromium plating had been materially increased, and is now usually from 0.0008 inch to 0.001 inch. An increase in the present thickness of chromium (about 0.00003 inch) is not advantageous. It would be better still to increase the total thickness of copper and nickel to about 0.002 inch. The cost of steel with such coatings is much less than that of stainless steel. In nickel deposition at high temperatures and current densities, a very low pH, for example from 1 to 3, gives a wider range for good deposits. The solutions with a pH of 3 or less are practically free from suspended matter. Initial pitting can be overcome with hydrogen peroxide. A plea was made for a better quality of steel. One cause of failures of chromium plating on automobiles, is the use of calcium chloride for snow and ice removal. It is more corrosive than sodium chloride, as it is not only hydroscopic and stays wet, but it also dydrolyzes to liberate hydrochloric acid.

2. *Aircraft.*—M. R. Whitmore, of the U. S. Air Corps, at Dayton, stated that on steel aircraft parts, either 0.001 inch of zinc or 0.0003 inch of cadmium is used. The cadmium is especially good for dimensioned and threaded parts and for marine exposure.

On aluminum alloys plating has not been extensively applied. The oxide films, such as are produced by anodic treatment in dilute chromic acid, are especially valuable for holding films of grease or lacquer, which protect against corrosion. The oxide films may also be dyed. Aluminum castings may be protected by dipping in 25 per cent sodium silicate solution, and then baking for 30 minutes. "Alclad" metal consists of duralumin, coated with a layer of pure aluminum, applied by rolling. It is only available in sheets.

The speaker concluded that more work should be done on the relation of accelerated tests, such as the salt spray and intermittent immersion, to the actual protective value of zinc and cadmium; and on the factors that affect the value of the aluminum oxide coatings.

3. *Hardware.*—R. E. Hicks, of Yale and Towne Manufacturing Company, stated that they have practically overcome stain spotting by allowing the plated articles to stand a few days before finishing and lacquering. The porosity has also been decreased by changes in the patterns. In the discussion, the use of burnishing instead of buffing was suggested as a means of closing the pores.

Crystal spots are now infrequent, as sulphur is excluded by an oil film. There is also less danger of sulphur gases in the holds of oil-burning steamships than in the coal-burning vessels.

For nickel plating on die castings, satisfactory results are obtained with solutions containing sodium sulphate. Chromium has proven valuable to increase the life of taps and dies used for cutting non-ferrous metals.

A reference to the cleaning of metals led to an interesting discussion regarding the removal of grease and buffing materials. Cleaning with oil or turpentine at 250 degrees Fahrenheit was mentioned; and also the application of "red oil" to facilitate removal of kerosene or similar oils in the alkaline cleaners. "Vapor cleaning," by condensing vapors of liquids, such as trichlorethylene on the metal surfaces, was also described.

4. *Silverware.*—F. C. Mesle, of the Oneida Community, described the methods used for plating 18 per cent nickel silver. He

pointed out that the following problems are in need of study. (a) Better and more rapid cleaning methods. (b) A means of controlling the carbon bisulphide content of "bright" solutions, and an explanation of its effects. (c) Control and measurement of metal distribution. (d) Control and measurement of hardness of the deposits. (e) The irregular corrosion of silver anodes. (f) The comparative value of sodium and potassium cyanides. (g) The effects of carbonates and other salts.

A discussion of "non-tarnishing" silver included the addition to the silver of cadmium, zinc, gold, and platinum. A cathodic treatment in dilute chromic acid was reported to retard the tarnishing.

B—G. B. Hogaboom Presiding

In the session devoted to reports from research laboratories, the following subjects were discussed:

5. *Researches at the Bureau of Standards.*—W. Blum summarized the work in progress, including (a) the protective value of chromium plating, (b) pH measurements with a glass electrode, and (c) miscellaneous activities of the section. Owing to several resignations, the research work, both by the Bureau staff and by Research Associates, has been seriously interrupted. Steps are being taken to fill the vacancies and to continue the researches.

6. *Analysis of Silver Plating Solutions.*—R. M. Wick, of the Bureau of Standards, reported the results of a study of methods of determining (a) free cyanide, (b) total cyanide, (c) silver, (d) carbonate, and (e) chloride in silver plating baths. In each case the methods were studied with respect to their value for research work and for plant control. It is hoped to publish the details of the methods in the near future.

7. *Plating on Zinc and Die Castings.*—E. A. Anderson of the New Jersey Zinc Company, discussed the methods of plating nickel on zinc and zinc base die-castings. The use of chlorine was suggested to coagulate grease suspended in the alkaline electrolytic cleaner. Dipping in 1 per cent hydrofluoric acid just before plating was found to promote good adhesion of the nickel. The latter is usually deposited from high sulphate baths.

Nickel and chromium can be stripped from zinc by a reverse current in concentrated sulphuric acid containing a small amount of glycerine. Chromium can be plated directly on zinc die castings, but only in a dull form. When this is buffed, it furnishes

excellent protection against corrosion, and is now used commercially.

The outstanding problems are (a) improved methods of cleaning, and (b) the production of softer nickel deposits with a thickness of about 0.0004 inch.

8. *Deposition of Zinc-Cadmium Alloys.*—C. J. Wernlund, of the Roessler and Hasslacher Company, described in detail the production of deposits containing from 10 to 15 per cent of cadmium and the balance of zinc. The cadmium serves as a brightener, and produces coatings which are harder than either zinc or cadmium, and which yields nearly as good protection in the salt spray as pure cadmium.

The deposits are made from "high alkali" zinc cyanide solutions, to which a small amount of cadmium oxide is added. The anodes consist of an alloy of zinc and cadmium in about the proportions desired in the deposit. The composition of the deposit is affected by the bath composition, including the content of free alkali, the temperature and the cathode current density.

9. *Plating Researches in American Universities.*—A report, compiled by W. Blum, showed that researches on electroplating have recently been conducted, or are now in progress in at least fourteen institutions, including Brown University, Columbia University, Cornell University, University of Indiana, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, College of the City of New York, University of Pennsylvania, University of Pittsburgh (Mellon Institute), University of Toronto, Vanderbilt University, Washington University, and the University of Wisconsin. Through such researches, many of the problems of plating are being solved.

C—R. J. O'Connor Presiding

Research Fund and Plans

The report of the Research Fund by Philip Sievering showed that there is now a balance of about $2,000. It was announced that immediate steps will now be taken to secure new subscriptions for a three-year period. The platers and chemists were urged to cooperate with the committee in every possible way. Just as soon as the funds and subscriptions warrant, one or more Research Associates will be engaged to continue the study of the protective value of chromium and other plated metals.

It was also suggested that the Society should, as soon as feas-

ible, adopt definite standards for plating and methods of test. Such standards may be revised from time to time as new information warrants. The Research Committee will take steps to prepare such standards in cooperation with the Bureau of Standards, American Society for Testing Materials, and other interested organizations.

The large attendance at this conference, including persons from many industries and from distant points, and the active discussions of various problems, shows that there is a need and demand for research on electroplating. The American Electroplaters' Society and the Bureau of Standards will make every effort to meet that demand. To do so, additional funds are needed. These may be subscribed by individual firms, for example in amounts of $50.00 per year for three years; or by groups or associations that desire research on the plating problems of a particular industry. Interested firms or organizations should communicate with the Research Committee, R. J. O'Connor, Chairman, 41 Bancroft Avenue, Bridgeport, Conn., or Philip Sievering, 20 South Crescent Street, Maplewood, N. J., secretary.

Those desiring information on publications on plating should address the Bureau of Standards, Washington, D. C.

List of those who attended the Conference:

F. E. Allen, United Chromium Co., Detroit, Mich.
E. A. Anderson, New Jersey Zinc Co., Palmerton, Pa.
S. R. Andrews, Monarch Lab., Utica, N. Y.
C. R. Auer, General Railway Signal Co., Rochester, N. Y.
C. A. Baker, Syracuse, N. Y.
F. M. Barry, Scovill Mfg. Co., Waterbury, Conn.
Wm. E. Baulieu, Jr., Bridgeport Brass Co., Bridgeport, Conn.
Eli J. Beaudery, Bastian Bros., Rochester, N. Y.
Harry C. Bernard, Oakite Products Co., Rochester, N. Y.
G. H. Blum, Eastman Camera Works, Rochester, N. Y.
Wm. Blum, Bureau of Standards, Washington, D. C.
Geo. C. Bichler, Wright's Plating Works, Niagara Falls, N. Y.
E. J. Boyer, Corona Typewriter Co., Groton, N. Y.
C. T. Brown, L. C. Smith & Corona Typewriter Co., Syracuse, N. Y.
J. Rowland Brown, Reliance Gage Column Co., Cleveland, Ohio.
A. Cameron, Taylor Instrument Co., Rochester, N. Y.
Floyd V. Campfield, Wm. A. Rogers, Ltd., Niagara Falls, N. Y.

E. T. Candee, American Brass Co., Waterbury, Conn.
F. M. Carlson, Erie, Penna.
Reg. Coulston, Buffalo, N. Y.
A. B. Cowles, Rochester, N. Y.
Martin Crean, Stern Mfg. Co., Syracuse, N. Y.
Edwin Crowley, C & S Plating Co., Mills St., Rochester, N. Y.
B. G. Daw, St. Louis, Mo.
O. L. De Martin, Stromberg Carlson Telephone Mfg. Co., Rochester, N. Y.
J. J. Desmond, North East Appliance Co., Rochester, N. Y.
Emil Deuber, Shuron Standard Optical Co., Rochester, N. Y.
M. Devereaux, Corona Typewriter Co., Groton, N. Y.
A. De Vries, Griffin & Yengst Co., Rochester, N. Y.
Jack De Vries, Valley Appliance Corp., Rochester, N. Y.
A. H. Doering, Eastman Camera Works, Rochester, N. Y.
J. A. Dutton, 195 South St. Regis Drive, Rochester, N. Y.
Bror Eliasson, Wm. A. Rogers, Ltd., Niagara Falls, N. Y.
Judson R. Elster, Rochester, N. Y.
John H. Feeley, Montreal, Canada.
C. O. Fields, Samson United, Inc., Rochester, N. Y.
Thomas E. Ford, Bruce Products Corporation, Detroit, Mich.
J. G. Fox, Frederick P. Stevens Co., Buffalo, N. Y.
Chas. Francis, Valley Appliance Corp., Rochester, N. Y.
S. P. Gartland, Rochester, N. Y.
Geo. F. Geiger, International Nickel Co., New York City.
John Gibson, Wm. A. Rogers, Ltd., Niagara Falls, N. Y.
Robert Gowen, Box 668, Rochester, N. Y.
Basil H. Green, Binghamton, N. Y.
Warren Guy, Trico Products Co., Buffalo, N. Y.
Carl Guy, Syracuse, N. Y.
J. R. Hagen, Wm. A. Rogers, Ltd., Niagara Falls, N. Y.
J. H. Halstead, Robison Rochester Corp., Rochester, N. Y.
Frank J. Hanlon, Chicago City Plating Co., Chicago, Ill.
Wm. Hart, Rochester, N. Y.
Charles Griffin, Rochester, N. Y.
C. L. Hehr, Rochester, N. Y.
W. A. Heinrich, Rochester, N. Y.
H. Herlikofer, Johnson City, N. Y.
Harold J. Hess, I. T. R., Endicott, N. Y.
R. E. Hicks, Yale & Towne Mfg. Co., Stamford, Conn.

Albert Hirsch, Philadelphia, Pa.

J. S. Hoffman, Detroit, Michigan.

George B. Hogaboom, Hanson-Van Winkle-Munning Co., Matawan, N. J.

C. F. Holtz, Stuart Oliver Holtz Co., Rochester, N. Y.

Geo. Horsley, Todd & Co., Rochester, N. Y.

J. M. Hosdowich, Waterbury, Conn.

John C. Hosoff, Eimer & Amend, New York City.

M. C. Hoy, J. B. Ford Co., Syracuse, N. Y.

John C. Hutchings, Taylor Instrument Co., Rochester, N. Y.

W. W. Jones, Monarch Lab., Buffalo, N. Y.

J. M. Keating, Eastman Camera Works, Rochester, N. Y.

P. A. Kelly, Rochester, N. Y.

O. B. Kirchhoff, Jamestown, N. Y.

F. T. Kirchmier, Bausch & Lomb Optical Co., Rochester, N. Y.

Frank Kolb, Bausch & Lomb Optical Co., Rochester, N. Y.

Paul C. Kramarcik, Lamson Corporation, Syracuse, N. Y.

John T. Krause, L. C. Smith & Corona Typewriter Co., Syracuse, N. Y.

J. A. Kushner, American Emblem Co., New Hartford, Conn.

Wm. J. R. Kennedy, Westinghouse Elec. Mfg. Co., Springfield, Mass.

Geo. J. Lawrence, J. B. Ford Co., Syracuse, N. Y.

Leo Lipinski, Bastian Bros., Rochester, N. Y.

R. P. Lopez, Hickok Mfg. Co., Rochester, N. Y.

E. G. Lovering, F. B. Stevens Co., Detroit, Mich.

G. A. Lux, General Railway Signal Co., Rochester, N. Y.

Frank B. Lyman, Brown-Lipe-Chapin Co. ,Syracuse, N. Y.

P. A. Lyons, Bausch & Lomb Optical Co., Rochester, N. Y.

W. D. MacDermid, MacDermid, Inc., Waterbury, Conn.

F. J. MacStoker, Garden City, Long Island, N. Y.

A. Mambretti, Rochester Chromium Corp., Rochester, N. Y.

A. D. Mayer, Hawkeye Works, Rochester, N. Y.

Hugh D. McCleese, United Chromium Corp., Detroit, Mich.

J. T. McCollough, Ternstedt Co., Detroit, Mich.

P. B. Mears, New York City.

Frank Mesek, Metal Arts Co., Rochester, N. Y.

F. C. Mesle, Sherrill, N. Y.

R. H. Minard, Bausch & Lomb Optical Co., Rochester, N. Y.

Lyle Morrison, Oneida Community, Ltd., Niagara Falls, N. Y.

F. W. Mulryan, Hawkeye Works, Rochester, N. Y.
B. Murphy, Eastman Camera Works, Rochester, N. Y.
R. J. O'Connor, Contract Plating Co., Bridgeport, Conn.
L. C. Pan, College of the City of New York, New York City.
John S. Perry, Eastman Kodak Co., Rochester, N. Y.
R. E. Petit, Aluminum Co. of America, Buffalo, N. Y.
W. M. Phillips, General Motors Corp., Detroit, Mich.
K. Pitschner, Firestone Steel Products Co., Akron, Ohio.
W. G. Price, Standard Brass Co., Utica, N. Y.
Chas. Puffer, Wollensak Optical Co., Rochester, N. Y.
Harry W. Puffer, Wilmot Castle Co., Rochester, N. Y.
Geo. Quinn, North Syracuse, N. Y.
C. A. Reama, Rochester, N. Y.
W. G. Rinehart, American Chain Co., Bridgeport, Conn.
Ed Roberts, Binghamton, N. Y.
Joseph Ruff, Trico Products Co., Buffalo, N. Y.
A. G. Russell, New York City.
H. C. Sanford, Aluminum Co. of America, Buffalo, N. Y.
P. M. Savage, McGean Chemical Co., Cleveland, Ohio.
W. J. Schneider, Roessler & Hasslacher Chem. Co., New York City.
Chas. V. Seagers, Corona Typewriter Co., Groton, N. Y.
B. M. Shight, General Railway Signal Co., Rochester, N. Y.
Philip Sievering, Philip Sievering, Inc., New York City.
Geo. Simmons, A. & J. Mfg. Co., Binghamton, N. Y.
C. J. Slunder, Aluminum Co. of America, Buffalo, N. Y.
Jack W. Snyder, Rochester, N. Y.
Horace H. Smith, Tiffany & Co., Newark, N. J.
Gustof Soderberg, Detroit, Mich.
A. D. Sopher, Egyptian Lacquer Co., New York City.
E. K. Strachan, Brown University, Providence, R. I.
O. D. Stuart, Stuart Oliver Holtz Co., Rochester, N. Y.
L. E. Sullivan, Matchless Metal Polish Co., Glen Ridge, N. J.
H. A. Todd, Hanson-Van Winkle-Munning Co., Syracuse, N. Y.
Van Winkle Todd, Hanson-Van Winkle-Munning Co., Matawan, N. J.
T. P. Thomas, Westinghouse Elec. Co., Pittsburgh, Penna.
W. A. Throop, Syracuse, N. Y.
R. Q. Warner, Syracuse Washing Machine Co., Syracuse, N. Y.
Gordon J. Watt, Corona Typewriter Co., Groton, N. Y.

E. J. Wernlund, Roessler & Hasslacher Chem. Co., Perth Amboy, N. J.

W. Andrew Wesley, International Nickel Co., Bayonne, N. J.

C. R. Wheeler, Lasalco Co., Elmira, N. Y.

M. R. Whitmore, Wright Field, Dayton, Ohio.

R. M. Wick, Bureau of Standards, Washington, D. C.

W. J. Wider, General Electric Co., Pittsburgh, Penna.

W. C. Wolfe, General Railway Signal Co., Rochester, N. Y.

H. K. Work, Aluminum Co. of America, Buffalo, N. Y.

Frank H. Wuland, Trico Products Co., Buffalo, N. Y.

W. G. Yengst, Griffin & Yengst Co., Rochester, N. Y.

TO MEMBERSHIP OF A. E. S.

This is answer to an inquiry from Mr. Edwin S. Gray, member of Pittsburgh Branch to the United States Public Health Service at Washington, D. C., on cyanide poisoning.

Mr. Gray has been in bed for eight months under treatment by physicians and felt that by publishing this reply to his inquiry he might help some member of the society and also caution members who work in cyanide solutions and do not use utmost care. He is a silver plater and was in contact with lots of cyanide.

They state that with regard to electroplating that the chief element of danger is in the use of a solution of potassium of cyanide. The fumes of which are breathed by the worker. The symptoms of acute poisoning are those of vertigo, headache, rush of blood to the head, appression of the chest, palpitation of the heart, a sensation of constriction around the throat with dryness, nausea and vomiting, and gasping respiration. To the stage of dysphnoea succeeds that of spasm with cold, perspiring skin, convulsions and involuntary micturition with loss of consciousness. In the stage of asphyxiation there is temporary suspension of respiration, retardation of heart action, delation of the pupils of eye, loss of consciousness, inspirations, cyanoses of the skin and mucous membranes, collapse, death.

Total of twenty-six symptoms in cyanide poisoning.

MR. E. S. GRAY, Pittsburgh Branch.

PROGRESS AND BENEFITS OF STANDARDS

Read at First Annual Meeting Los Angeles Branch, March 15, 1930, by F. A. Maurer, B. S., Chemist at Edison Elec. App. Co., Ontario, Cal.

A standard is a criterion of excellence—since early times man has struggled for some definite standard by which he may measure the fruit of his labors. In some lines of endeavor it has been very easy to set up standards. Definite weights may be taken or measurements made, or a definite count taken: It has always been exceedingly difficult to measure the quality of plating, however, because there has been no tangible basis of measurement. On account of the difficulty of measurement the plating industry has been backward about setting up standards. Now, however, there is insistent demand from purchasers of plate for definite guarantees of performance. The purchaser is demanding that he be shown the comparative value of the plate he is buying.

A great deal of research work has been done on testing the quality of nickel plate, copper plate and zinc plate in response to this demand. Also methods of insuring an absolutely uniform deposit of metal on each piece are being devised.

A few years ago standards in the plating industry were unheard of. Each shop put its plate on its own way. There was no universal method of specifying a plating job. As a result there was the greatest kind of confusion. The axiom, "let the buyer beware," prevailed. No definite guarantees were made, in fact none could be made. As the situation with respect to plate, so the situation with respect to plating supplies. Each plater had his own favorite grade or brand of each of the materials he used.

In line with the insistent demand from purchasers for quality standards to base their purchases upon, this situation has greatly altered. We believe it has altered for the better. We believe it has caused the production of better plating supplies, and we believe it has caused the production of a better quality of plate.

A few years ago, how often was the salesman asked about the composition of his supplies, how often was the purchasing agent interested in anything but the price? Probably seldom did he consider what effect the purity of chemicals would have on the ultimate cost. Usually he wanted to pay out the least per pound—and

single nickel salts were only single nickel salts with very little interest shown in them except the price.

Now, however, man demands a standard of excellence in the plate he buys. Since the plater must knuckle down and meet certain specifications as to thickness of plate, luster, and ability to withstand corrosion, he has had to intensively study his methods of producing the plate, and he has had to make a study of the properties of his plating supplies. He has demanded better plating equipment from his supplier and he has demanded better plating chemicals.

The more intelligent platers of the country have long since learned the value of swapping ideas. When two men exchange dollars they each have one, but when they exchange ideas, each has two. Through the medium of the Electro Platers' Society money was made available for research work in plating at the Bureau of Standards. This work has been the means of arousing a great deal of interest in better plating methods. Rapidly we are dispersing the great thick blanket of mystery and secrecy which formerly permeated the plating industry. We are now opening up the industry to investigation and research. As a consequence we are getting results never before dreamed of. An illustration of what I mean may be seen in the extremely short time it has taken us to get into large scale production of high quality chromium plating. It was only accomplished because results were widely published, and the interest of the whole country concentrated on the subject.

Some time ago Blum and Hogaboom in their authoritative work, "Principles of Electroplating," stated "There is today no greater need in the plating industry than the development of reliable specifications and methods of testing the products." A yardstick has most certainly been needed. We ought to know the thickness of the coat, the evenness of distribution, its resistance to corrosion, the degree of adhesion to the base metal, the porosity, and the hardness.

The literature has contained many helpful articles on methods of determining and setting up standards for these variable factors in plating. Prof. Baker has published a system of rating results from Salt Spray tests. Blum and Thomas, Karl Pitschner and N. J. Gebert have published good work on the ferroxyl method for testing porosity of nickel and copper plates. A method has been

devised for controlling the thickness of plate from an acid copper sulfate bath. ("Metal Industry," Vol. 27, No. 10, p. 478.)

With so much interest displayed in the subject, I think it will not be far to the day when there will be several standard grades of plating produced in the industry, which can be bought on specification and test. The bringing about of this result cannot fail to be helpful to buyer and seller alike.

In our own plants we endeavor to keep up with the latest developments in plating. We have set up in all about twelve standard grades of nickel plated finishes, from the finest finish obtainable for high grade table appliances to the lowest finish, for rust proofing only in parts ordinarily not visible. Each finish differs very slightly from every other one, either in thickness of plate, in method of preparing the surface, or applying the plate, or buffing. We have four or five separate and distinct nickel plating processes. Each process differs in some respect from any of the others. One may be intended for a bright plate, another for a heavy plate for protection against oxidation at high temperatures, another to give a rapid plating time, and another for parts of odd shape.

The variable factors in a process are as closely controlled as is consistent with good practice. These factors may be current density, voltage, chemical composition of the plating solution and the anodes, temperature, time for plating, and acidity. We have instruments which give us current density, voltage, temp. and time.

Chemical analyses of the solutions are made at frequent intervals, and the P H or acidity of the solution is very carefully maintained at the correct figure. Chemicals are added when analysis shows they are needed.

We also maintain a control over our plating chemicals. These are carefully examined before use, and are bought on definite specifications as to purity. Certain small amounts of impurities in the chemicals can be very harmful whereas in other cases a small amount of impurity may be of no consequence, or may be positively beneficial.

After the plate has been applied and buffed our work is not yet done. We must test the plate for adherence, porosity, evenness of distribution, resistance to weather conditions and thickness. If our previous work has been carefully done the plate will pass the final test satisfactorily. If certain precautions have been overlooked, the plate may not be satisfactory. In that event, search is

made until the incorrect condition is determined and remedied. In some cases the fault of poor plate has been found to lie not in the plating room, but in some step in the process beyond control of the plating foreman. A general control must therefore be maintained over all materials used and over all processes, so that for example, steel suitable for electroplating is used in press work, and cast iron, which is dense, fine grained and free of pores is produced in the foundry.

A control program as outlined above involves considerable expense and time, but is the only practical way to obtain a large volume of high grade plate at reasonable cost. Money so spent should be regarded not as an expense but as an investment, which will yield very handsomely.

LOS ANGELES BRANCH PRESENT AND FUTURE

Read at First Annual Banquet, March 15, 1930, by M. D. Rynkofs, Secretary

For your information, I would like to call your attention to the fact that this assembly is the largest group of men interested in Electroplating ever congregated on the Pacific Coast at one time.

The purpose of this branch in having become affiliated with the American Electro-platers' Society readily visible here today, is to improve our knowledge of plating and its research possibilities.

We consider this achievement (I call it an achievement because the platers in L. A. have tried to organize themselves for the past number of years with but very little or no success), very essential to the Electroplating Industry, particularly on this coast. And so we have one thing in view and that is "A Society for the Advancement of the Science of Electroplating."

The research work in Electroplating not only is carried on here in Los Angeles, but in the entire United States, Canada and England. "Research" is a word that is no longer a private or "Highbrow" term. Research is now understood by most everyone, from the plater's helper to the president of the company, and in no industry is research more highly regarded than in Electroplating.

The initial research work is always something of a gamble. We must devote efforts to groping in the dark. We must spend money in driving tunnels through mountains in the hope that we will find

the treasure of new facts or truths which will make our work clearer, less difficult, less costly and more valuable.

The Electroplating Industry is now confronted as never before with the need of true facts. Twenty years ago nobody cared much how deposition of metal was performed commercially, because a Plater was a Plater, and a Plate was a Plate and that was all there was to it. Now we know that a Plater should be a solution analyst and a Plate should not only be bright but it must be heavy, uniform, corrosion-resistant and economical. The public is awake to the beauty and utility of the fine Electroplated finish and is making demands which this trade must satisfy.

Electroplating as an industry, has grown apace and is still growing at a faster rate than ever before. It cannot continue without a firm foundation of new facts, improved methods and processes and improved results. How are these to be obtained? By guesswork? By sporadic individual efforts here and there? By accidents and stumbling over new devices? We say that where such weak methods aid us, we are glad to accept their help. But we cannot build a great industry upon them. We must have solid, well laid plans in the hands of responsible, trained and intelligent leaders.

Therefore the most important development in this industry on the Pacific Coast was the affiliation of the Platers with the American Electroplater's Society. A well balanced industrial development requires both new participants and expansion of those already operating. When I say this development requires new participants, I mean that we welcome all qualified platers on the Coast, particularly in this vicinity. And for the benefit of you who wish to join this branch, I suggest they fill out their application today and save the initiation fee increase, which will become effective April 1.

The next most important development is the Chemistry class of the Los Angeles Branch, which is being administered by this branch in co-operation with the Board of Education. This class had its initial session less than a month ago when 37 men responded and has been gradually increasing in such proportions that the School Board will be forced to make preparations to start another class.

Remember the Los Angeles Branch, still in its infancy, is being commented upon for its progress by the entire plating industry in

the country. The Supreme Secretary made the following comment: "I want to compliment the Los Angeles Branch and all its officers for the good work accomplished so far by your branch. You all deserve great credit for the same and your work and enthusiasm has been wonderful and far greater than that of a great many of the branches east of the Rockies, so keep it up and by this time next year Los Angeles will be pushing some of the larger branches aside and taking their place."

Our Supreme President wrote a few days ago and he said: "From the reports I have on hand and read in the Review and Metal Industry, you sure have some live branch, and allow me at this time to congratulate you on the wonderful start you have made."

It is true—we did make a pretty good start.

The Supreme Secretary says something about pushing some of the larger branches aside and taking their place. For that remark we have pushed aside some twenty branches, Los Angeles standing in fifth place in membership, exceeded only by Chicago, Philadelphia, New York and Newark. It will be recalled that at our Smoker Meeting last October, this position was predicted for Los Angeles and is now realized. But why stop at fifth place? Why not make it second place? It is possible, but it's up to each one of you to help keep it up as near the top as possible. It may interest you to know that there are over 100 more Platers who will qualify right here in Los Angeles, not to speak of a possible invasion of other cities in this vicinity.

I may also call to your attention that at our monthly meeting held Wednesday evening this branch elected 18 new members to its fold. This is a distinct honor for the Los Angeles Chapter and I have learned we have set a record in electing the 18 members or the largest group ever known to be admitted to any branch after the branch had been established.

NEWARK BRANCH

The regular monthly open meeting of the Newark Branch A. E. S. held on the date at 41 Franklin street, Newark, N. J. Vice-President O. Cabalrese presiding, called the meeting to order at 8:30 p. m., there being fifty-eight members and four visitors present.

In the Question Box the following questions were found:

Ques.—Proper nickel solution for plating various kinds of work?

Ans.—Ni. solution contains 2 oz. metal per gal., 3 oz. chloride per gal. pure anodes 80° F., producing a soft deposit. PH 6.0 6.2.

Ques.—What is a good process for changing a blue onyx stone to blue. No answer.

Ques.—Can aluminum be ball burnished?

Ans.—Try mild alaklia neutral soap, small amount of cyanide, 100 R. P. M.

Ques.—Is zinc sulphate the best sulphate factor to add to chromium plating solution—irrespectvie of the amounts of chromic acid used per gallon? (This question brought out a difference of opinion.)

Ans.—It does not make any difference what kind of a sulphate used, so long as the sulphate radical is correct. That zinc sulphate gave the best results.

Ques.—Does agitation of electrotype or agitation of cathode have any appreciable effect on the character of deposit?

Ans.—Yes; allows use of higher current density and appreciable effect on deposit.

The monthly open meeting of the Newark A. E. S., with Vice-President Cabarese presiding, there being fifty-four members present.

Report by the Banquet Committee urging all members to attend banquet, Saturday evening, April 26, 1930. Mr. Sizelove spoke on his trip to Pittsburgh with Mr. Smith.

Mr. George Ohl and Mr. George Hogaboom were scheduled to speak on superdepositing, but due to Mr. Hogaboom's illness, it was postponed to a later date. The Question Box was brought out and it contained a large number of questions.

Mr. Paul Adam, our librarian, read a paper, the title of which was, "Plating on Aluminum," written by our English friend across the old Atlantic. The paper brought forth much criticism both pro and con.

Ques.—Directions for the maintenance of bright dips previous to silver plating for German or nickel silver which will not mar the polish surface.

Ans.—Work of hard solder, pickle, rinse and dip in hot black, boil old bright dip with large amount of water. Then dip in bright dip composed of 2 parts sulphuric acid, 1 part nitric acid and 1 qt. water.

Ques.—Can aluminum be ball-burnished, small work?

Ans.—Yes. Try nuld alaklia 2 oz. sod. phosphate, neutral soap, small amount of cyanide.

Ques.—Can cadium be deposited on steel by immersion?

Ans.—Yes. Experiment cadium oxide, cyanide, pot. hydroxide.

Ques.—Is zinc sulphate the best sulphate factor to add to chromium

irrespective of the amounts of chromic acid used per gallon? (This question brought out much discussion.)

Ans.—It does not make any difference what kind of a sulphate used is added to bath, so long as the SO4 radical is correct.

Mr. Proctor contended that zinc sulphate, according to his opinion, gave the results.

Ques.—Does agitation of electrolye or agitation of cathode leave any appreciable effect on the character of deposit?

Ans.—Yes, and allow the use of higher current densities.

Ques.—Do chromium ions have a greater affinity for ferro chromium alloys than for nonchromium alloys containing ferroalloys?

Ans.—Yes.

Ques.—Why does a chromium bath increase in specific gravity with use?

Ans.—Sometimes in making a bath the chromic acid is not thoroughly dissolved and after stirring or working, the specific gravity would naturally rise to top during stirring, because chromic acid is naturally heavy.

Ques.—What is the best method for chromium plating peuter or soft metal novelties, such as lead or brittaine metal; also die cast metal?

Ans.—Cleaner 4 tri-sodium phosphate 2 oz. sodium carbonate, rinse 1% hydrofloruric acid dip; nickleplate color buff and then chromium. Do not copperplate brittania metal, as this metal absorbs copper. After cleaning in tri-sodium cleaner, use sulphuric acid pickle, then direct to nickle solution, then to chromium.

Ques.—What is a good chromium plating bath for German silver?

Ans.—44 oz. chromic acid, 3 oz. by weight of sulphuric acid.

Ques.—What is the safe limit of cc of ammonium hydroxide used in nickle solution?

Ans.—35 cc to 47 cc per gallon. But we know of solutions run on automatic plating of steel sheets, being run all day and night, that contain as high as 50 to 100 cc per gallon.

The regular monthly open meeting of the Newark Branch held on Friday evening, March 21, 1930, at 41 Franklin street, Newark, N. J., Vice-President Calabreese presiding, with an attendance of eighty-six members and visitors present, welcoming a delegation of New York members headed by President Waushalter, who were given a wonderful ovation.

The speaker of the evening was Dr. Mantell of the Pratt Institute of Brooklyn, N. Y., who spoke on the deposition of aluminum, its application and effectiveness, its corrosive qualities. The method used in the making of 99.5 aluminum. The description of the cell used, the amperages used running from 10,000 amperes to 28,000 amperes, with 5½ volts pressure and a temperature of 900 to 1000° Cent. The plating bath used depositing aluminum ethyl ammonium bromide, 40 volts pressure, 3/10 amperes, 1 dessinmeter apart, solution heated to 100° C.

The Subjects for Coming Meetings

April 4th—Question Box.

April 18th—Results of experiments undertaken in chromium plating reflectors.

May 16th—Dr. Pan of New York University.

April 26th—Newark Branch banquet.

GEORGE REUTER, Secretary.

A. E. S. ANNUAL CONVENTION

Come to Washington, D. C., Educational Bee and Make a Little Whoopee—But Do Not Forget Your Certificate from Railroad, It Means One-half Fare One Way. Heh, Heh

The Annual Convention of the American Electroplaters' Society is to be held this year at the Mayflower Hotel in Washington, D. C., on June 30, July 1, 2 and 3. Splendid accommodations can be obtained at the hotels at very reasonable rates. As the day following the Convention is a holiday (July 4), it will be convenient to spend the rest of the week in Washington seeing the many sights. This would make a wonderful vacation for the whole family.

BY LAND . . . . .

OR SEA . . . . .

OR AIR . . . . .

We only need 125 certificates when we purchase our ticket to get one-half fare back home. Get one.

Committee.

Branch officers and delegates to annual convention will kindly make note of personnel of all committees herewith, that time and confusion may be eliminated at our Washington, D. C., meeting; also men whose names appear on these lists will kindly report to chairman of their committee as early as possible Monday morning, first day of convention, and oblige.

Yours truly,
H. H. SMITH, President A. E. S.

Research Committee

Mr. R. J. O'Connors, Chairman, 42 Bancroft Ave., Bridgeport, Conn.
Mr. Philip Sievering, Secretary and Treasurer, 199 Lafayette St., New York.
Mr. E. R. Wood, Landers, Frary & Clark, New Britain, Conn.
Mr. W. W. McCord, 2587 E. Grand Blvd., Detroit, Mich.
Mr. E. J. Musick, 7144 Kingsbury Blvd., St. Louis, Mo.
Mr. John Merigold, 425 E. 92nd St., Los Angeles, Calif.
Dr. Kenneth Graham, University of Pennsylvania, Philadelphia, Pa.
Dr. Wm. Blum, Bureau of Standards, Washington, D. C.
Mr. Geo. Hogaboom, 557 Stanley St., New Britain, Conn.
Mr. Benjamin Popper, 90 West St., New York.
Mr. Sylvester Gartland, 126 Bryan St., Rochester, N. Y.
Mr. John Magill, 153 Margueritta St., Toronto 4, Ontario, Can.
Mr. Ernest Alsfeld.
Mr. Donald Wood, 382 Boylston St., Boston, Mass.
Mr. Ellsworth T. Candee, % American Brass Co., Waterbury, Conn.
Mr. E. K. Strachan, Ph. D. Chemist, Brown University, Providence, R. I.
Dr. Hiram Lukens, University of Pennsylvania, Philadelphia, Pa.
Dr. Oliver P. Watts, University of Wisconsin, Madison, Wis.
Mr. Frank Hanlon, Editor, 3040 Diversey Ave., Chicago, Ill.
Mr. Thomas P. Thomas, Westinghouse Elec. & Mfg. Co. Research Lab., East Pittsburgh, Pa.
Mr. F. G. Cyrex, 1964 E. 105th St., Cleveland, Ohio.
Mr. J. Zwisler, 1269 Leonard St., Dayton, Ohio.
Mr. J. Van Plank, Zeeland, Mich.
Mr. Robert Steurnagle, 1508 Concordia Ave., Milwaukee, Wis.
Mr. Jas. E. Nagle, 3835 Alexis Ave., Toledo, Ohio.
Mr. Roger H. Bryant, American Steel & Wire Co., Worcester, Mass.

Committee on Exchange of Papers Electroplaters and Depositors Society of England

Mr. Philip Uhl, Chairman, Philadelphia Branch, 2432 N. 29th St., Philadelphia, Pa.
Dr. Wm. Blum, Baltimore-Washington Branch, Bureau of Standards, Washington, D. C.
Mr. S. E. Hedden, Pittsburgh Branch, 227 Fifth St., Aspinwall, Pa.

Prize Exhibit Award Committee

Mr. Walter Fraine, Chairman, Dayton Branch, 507 Grand Ave., Dayton, Ohio.

(Continued on page 35)

A. E. S. PAGE

Assembled Expert Scraps With and Without Significance

Rochester Research Meet was a humdinger and the chairmen: Gartland and Hogaboom, past pres., of A. E. S., sure kept it going all the time.

The speakers lost no time getting down to tacks and everything on program was covered.

Plating standards, as Geo. Gehling spoke about, and similar to the ones set for buffs, abrasives and euc salts, etc., will help plating industry now more than investigation.

Dr. W. Blum sure introduced in Mr. Wicks a young man who could explain his topic as plain as a plater needs to understand what it is all about.

Dr. Wernlund used a good phrase in his mention of anode current density. How soon a comparative for this?

George Lawrence sure knows his stains; Alkali George, it should be: Horses.

Phil Sievering was there with his bag and looking for new and more subscriptions for Research Fund.

R. J. O'Connor has been researching so long that he can almost tell where you keep it. Now.

Pres. Smith sure knows his Elks and the Ex Board are glad they know him.

Pres. Reama and Secty. Griffin of Rochester Branch, sure can "liquidate" a large crowd. R. Lobez is sure a game member.

Mr. Whitmore of War Dept., was an interesting speaker, and dropped some good thoughts.

Hope F. C. Mesle, former editor and past pres., did not take trip to Chicago to get himself shot for losing his exhibit of anodes. "You spoiled them," Frank. So why worry?

We think those silver anodes could of been found if so many silver platers had not looked for them.

(Continued from page 33)

Mr. N. C. Zadowski, Cleveland Branch, 6517 Bridge Ave., Cleveland, Ohio.

Mr. Wm. M. Delage, Hartford, Conn., Valley Branch, 16 Grandview Ave., Waterbury, Conn.

Mr. Dan Wittig, Milwaukee Branch, 375 Third St., Milwaukee, Wis.

Mr. Frank Kolb, Rochester Branch, Bausch & Lomb Optical Co., Rochester, N. Y.

Incorporation Committee

Mr. Geo. Hogaboom, Chairman, Newark Branch, 557 Stanley St., New Britain, Conn.

Mr. John E. Sterling, New York Branch, 2581 46th St., Astoria, L. I.

George Gehling, Secretary-Treasurer, Philadelphia, Pa.

Paper Award Committee

Mr. F. C. Mesle, Chairman, Rochester Branch, 160 Willow Place, Sherill, N. Y.

Dr. Kenneth Graham, Philadelphia Branch, University of Pennsylvania, Philadelphia, Pa.

Mr. Frank Hanlon, Editor, Chicago Branch, 3040 Diversey Ave., Chicago, Ill.

Mr. Oliver Sizelove, Newark Branch, 919 Chancellor Ave., Irvington, N. J.

Mr. Chas. Proctor, New York Branch, 264 Argyle Pl., Arlington, N. J.

Mr. Franklyn J. MacStoker, New York Branch, 19 Princeton St., Stewart, L. I.

Dr. Wm. Blum, Bureau of Standards, Washington, D. C.

Membership Committee

Mr. George Hogaboom, Chairman, Newark Branch, 557 Stanley St., New Britain, Conn.

APRIL MEETING OF THE BOSTON BRANCH OF THE AMERICAN ELECTROPLATERS SOCIETY

The regular monthly meeting of the Boston Branch was held at the American House, Boston, on Thursday evening, April 4, 1930, at 8 o'clock. The attendance was the highest of the year, over sixty-five being present.

The meeting was called to order by President Gale. He first welcomed the Providence Branch representatives of whom there were twenty present, having chartered a special bus for the occasion. This indicates fine inter-branch spirit and the Providence Branch is to be congratulated on such a fine showing. He also welcomed a representative of the Worcester Branch.

The speaker of the evening, Dr. Blum of the Bureau of Standards, was next introduced. The large turn-out and fine reception was, of course, a personal tribute to Dr. Llum who has done so much for the plating industry that his name is a by-word among platers.

Dr. Blum's subject was "Chromium Plating." He outlined the developments of chromium plating; the uses of the same; methods of plating; solutions; plating conditions, specifications for plate; re-

searches, past and present; and practically all important considerations affecting chromium. Dr. Blum was given a hearty round of applause, and then answered questions. There proved to be plenty of questions and the genial doctor was kept busy.

At the end of the question session Dr. Blum was given a rising vote of thanks, and the meeting was adjourned at 10:45 p. m.

THOMAS JOHNSON, Secretary.

DETROIT BRANCH

Detroit Branch A. E. S. held its regular monthly meeting Friday, April 4th, at the Statler Hotel, President B. F. Lewis presiding. After the regular order of business the meeting was then turned over to the Chairman of the Educational Committee, Mr. Jameson, who introduced the speaker of the evening, Mr. C. E. Van Dereau, superintendent of Westinghouse Products Co. and first vice-president of our National Society, who gave a very interesting and educational talk on the "Material Cost of Finishing." This meeting was well attended and closed with the question box.

CHAS. M. PHILLIPS, Secretary and Treasurer.

TO THE MEMBERS OF BRANCHES

I am writing as Chairman of the Papers Committee for the Washington Convention to ask your assistance in securing suitable papers for our educational sessions. We expect to have least four three-hour periods. One session will relate to chromium, one to nickel, one to the education of platers, and one to miscellaneous subjects. If the number of papers warrants, additional sessions will be provided.

We are anxious to secure reports from both chemists and platers. In recent conventions the majority of papers have been presented by chemists. This is natural, because the chemists usually have more time and facilities than the platers for conducting researches. But in addition we want more papers from platers, who may for example give reports on their own developments, or on their experiences in using the results of research. Brief presentations are desirable in order to allow ample time for discussion.

Please read this letter to your Branch, talk it over with the members, and with interested chemists in local plants or colleges. In order that we can arrange the program in time to have it printed and distributed before the Convention, authors should send titles of the papers to the undersigned before May 10.

The Convention sessions will be just as interesting as you make them!

Sincerely,

W. BLUM,

Chairman, Papers Committee, Bureau of Standards, Washington, D. C.

CHICAGO BRANCH

The 217th regular monthly meeting of Chicago Branch A. E. S. was held Saturday, April 12, 1930, at the Atlantic Hotel.

Meeting called to order with President S. J. C. Trapp presiding and all officers, excepting vice-president, were present.

The meeting was very well attended.

Mr. H. A. Gilbertson, Chairman of the Educational Committee, gave the following report for the Chemistry Class:

Educational Committee of the American Electroplaters Society

The Chemistry Class started March 13, at 7:45 p. m., at Crane Junior College Laboratory located at Jackson and Oakley Boulevards. Thirty-nine members were present exclusive of the instructors, Mr. Faint and his assistants, J. H. Hoeper and C. Kocour. Four others had registered, but were unable to attend the first meeting. This made a total membership of fourty-six.

There was no delay in getting started, in fact, in half an hour the class was organized and ready for work. Owing to the lack of proper apparatus, a little time was lost, but even with this delay we were able to make a free acid determination of acid copper solutions which certain members of the class had provided.

It was fratifying to the committee to see the earnest interest and attention shown by the members in their splendid co-operation with the instructors. It could easily be seen that the class was a wonderful success. I, personally, hope that this start of educational work in our Branch has now taken on a permanent aspect. I have been a member of all previous classes the Branch has had and I must say that this class is not only the largest, but also the most sincere of any yet held. My earnest wish is that this class will be the start of a progressive educational program which will benefit every member of the organization.

The committee has decided to have printed the complete course and this instructive booklet of the Analysis of Solutions will be issued to each member of the Branch at the completion of this course.

Mr. Harold Faint, the instructor of the class, gave an outline of the progress the class was making. This created much interest and was appreciated.

Two of our more fortunate members who were sojourning in the sunny south were with us again—Mr. Sam Huenerfauth, who had been to Florida, and Mr. Earnest Lamoureux, who had been to California. Both had some very interesting stories to tell.

Mr. J. J. Mulligan, superintendent U. S. Lead Refining Co., gave a very interesting talk on use and care of lead anodes in chromium baths.

This subject was very much appreciated because of the great amount of chromium plating being done at the present time.

The meeting was then turned over to our Librarian, Mr. O. E. Servis, who found the following questions in the question box:

Ques. 1. Single nickel salt sol. is peeling on gray casting, but is O. K. on cold-rolled steel. What is the reason?

Ans. 1. Overpickling causes a graphite film to appear on the surface. Remove by scouring.

Ques. 2. What is a good formula for stripping nickel from steel? Nickel has a rather heavy deposit.

Ans. 2.

Sulphuric acid 66 degrees B	1 gal.
Water	1 pt.
Glycerine	1 oz.

Use lead anodes and reverse current.

Ques. 3. What causes a rainbow color in chrome plate after it is buffed?

Ans. 3. It might be due to buffing compound not being removed or too low in sulphates.

Ques. 4. What is a good strip for chrome?

Ans. 4. Did in strong muriatic acid, or use a weaker sol. with reverse current. A strong alkaline cleaner with reverse current can also be used.

Ques. 5. How can zinc be taken out of black nickel sol.? This sol. is used to plate zinc name plates, and the zinc is dissolved, which causes the zinc to go into sol. to excess.

Ans. 5. Zinc cannot be removed economically.

Ques. 6. What is a good buffing composition for Alleghany metal besides chrome compositions?

Ans. 6. Aluminum oxide and stearic acid.

Ques. 7. Can die-cast be plated in a barrel?

Ans. 7. Depends upon type of work. A higher voltage and concentration of sal-soda than in still plating is required.

Ques. 8. How does iron get into a cleaner or plating sol. and what is the effect on the plate and anode?

Ans. 8. Improper rinsing when taken from pickles, suc has chlorides, sulphates, etc., or other impurities are introduced, which may all have a more or less corrosive action on both anode and cathode under the influence of the current, particularly so at high temperatures.

Ques. 9. What is a good black dip on cadmium plate?

Ans. 9. Cyanide copper sol. with arsenic dissolved in it or molybdic acid.

Ques. 10. What is a good method for plating copper on silver backed mirror?

Ans. 10. First precipitate silver on glass with silver nitrate and Rochelle salts. After three swabbings the reflector is cleaned in distilled water and placed in sulphate copper sol. for about five minutes and a nice copper deposit results. Back up edges with asphalt paint.

J. C. KRETSCHMER, Secretary and Treasurer.

PHILADELPHIA

Report of Educational Portion of Monthly Meeting of the Philadelphia Branch, American Electroplaters Society, held at the Harrison Laboratories, Philadelphia, Pa., Friday, March 7, 1930.

Question Box conducted by Mr. George Gehling.

MR. GEHLING: Has anybody any written questions they would like to bring up tonight?

MR. ROBSON: A peculiar thing has happened. A fellow had a lead lined tank, and he used 99 per cent pure lead, put a chromium solution in it and used the tank for about three days, using the lead lining as an anode. The chromic acid has eaten the lead clean out of the tank. There are apparently no shorts in the tank that they could find, but the lead is gone clean off the sides and the bottom of the tank. The ends are untouched.

MR. LEDIG: We had one like that that started, but we put sheets of wired glass in there and that stopped it. This sounds like a short circuit in his heating system.

The tank is grounded for one thing, and electrolysis took place in that tank, and for that reason we don't connect our water system to the city main at all, we left a wide open water system to kill the possibility of such a ground.

MR. LUMBECK: Those conditions are very peculiar. One man does like Mr. Ledig, puts in glass lining, to cure the trouble. I have taken all my glass lining out.

MR. LEDIG: We didn't put lining in, we just put in sheets of wired glass. We had polarity trouble, but not dissolving the tank. But this thing here looks like a ground. Because the lead will not dissolve without electrolysis action there.

MR. LUMBECK: I electrolyze mine half a day every week to form lead peroxide on there. I took out the glass lining because the tank was entirely lined with glass, and in between the cracks it went clear through the lining, and I took out the glass lining, and have had no trouble since. I have both my city water and my hot water or steam line connected right together, but of course I have an insulator in between them.

MR. ROBSON: My opinion was that it was electrolysis.

MR. GEHLING: Well, I have several samples here that were handed in, and they have been plated in a nickel solution. They have rough spots on them. I will hand them around and let the boys look at them. How were those racked?

MR. LUMBECK: Through that center hole, horizontally, about an inch and a half apart.

MR. CLARK: Were they plated in a hot solution?

MR. LUMBECK: Warm, about 85 degrees.

MR. HIRSCH: I have had quite an experience with things like that. I think it comes from the anodes. Those posts we used to plate,

every now and then we would get a lot of junk like that, with some plated rough and some not. Then I watched the men. In the morning they used to take the anodes and lift them all off and hang them on a cathode bar and clean the anode. And every time they did that, we got a batch of that kind of work. And then, talking to George Hogaboom and following up his work, I found I had a lot of sulphate in there, and the magnesium sulphate acts on the anode and causes that to come off on a lot of pieces. And after cleaning that solution and, filtering it out, taking out all the sulphate and putting about eight ounces of nickel chloride in there, those anodes corroded evenly without any trouble. Another thing that will help a lot is sodium perborate.

MR. LUMBECK: We use that. Just along that line, I would like to say that my solution is filtered every week. I get about 15 hours' run of filtering on there every week, and I have no magnesium sulphate in that solution at all, that is, there has none been added to it. I am using a 99 per cent anode. I agree that I think the trouble comes from the anode. But the thing that is most peculiar to me is that those anodes are not disturbed.

MR. GEHLING: Now Mr. Lumbeck, don't you remember going through one of the plants in Detroit, and having one of the men tell us that he threw out every one of those 99 per cent plus heat-treated anodes?

MR. LUMBECK: Very well, because I had it very vividly in mind at the time.

MR. GEHLING: Now I came back from there and I ran into the same thing, and I ran into that on one of the jobs in this way. We plated work two to three bours in a tank, and after listening to that talk last summer, when I hit this place out here, they showed me these plates. They had plates about that long (indicating about 2½ feet) and in some places it wouldn't be evenly distributed, just in spots. They were all rough, and nobody could tell what it was. The solution was all being filtered, and these were all new anodes. We took all the depolarized anodes, as they called them, out of the tank and put the old 95 per cents back in the tank, and we didn't have a bit of that stuff.

MR. LUMBECK: But what mystifies me is that there would be just some on the one rack. I would be inclined to think the whole load of the tank would carry it or a whole rack.

MR. GEHLING: These plates were the same way. As the anode dissolved, some of these granules would come off and be carried over to that spot, and while it was carrying it over there, maybe there was a new spot it was starting to attack from the bottom, and by the time this one was all off the other one would come. And naturally, changing your batches, first you would have it here, and then you would have it there. It couldn't come off evenly. If it came off evenly rough all over like a hunk of sandpaper, why it would be a mighty good invention because I know one or two platers in this town who would

pay good money for that kind of invention, because in the dental industry they have to make what they call files, that are made and look like sandpaper, they take very thin flexible spring steel, which they lay flat and take a salt shaker filled with emery, and shake the emery evenly over the flat surface, and then nickel-plate on top of that, the plating holds that emery in place so that it can be used as a file.

QUESTION: Mr. Lumbeck, do you filter your solution while it is in operation?

MR. LUMBECK: No, it starts Saturday noon and runs till Sunday morning.

QUESTIONER: Well, I have the same trouble and I filter mine while in operation.

MR. LUMBECK: I might say this work is plated in a 20-foot conveyor tank, I also have a still tank with only 95-97 per cent anodes and we do not have this trouble in that tank.

MR. CLARK: I put in 95 per cent or 97 per cent about eight months ago, and one of the new ones, I put in there, I painted on one side with black asphaltum. The side that hung against the side of the tank. It dissolved all on one side, and hadn't touched that painted side. I think there is a lot of advantage in painting the anodes, that is, the side that hangs against the side of the tank.

MR. REYNOLDS: Do you use muslin bags on them? That might be a remedy, as long as you have the 99 per cent anodes.

MR. GEHLING: It wouldn't be necessary to put them in a bag; why not go out and get some unbleached muslin and hang a curtain down in front of them?

MR. HIRSCH: We swung over to rolled annealed anodes, American Mond anodes, and they corrode very evenly and nice.

MR. GEHLING: But you are using a barrel.

MR. HIRSCH: Now I am; I am speaking of when I used a still tank. I don't have that trouble in a barrel.

MR. GEHLING: Nobody else does, with barrel tanks.

MR. UHL: How long were they in the solution?

MR. LUMBECK: About 45 minutes.

MR. CLARK: Do they show any signs of composition, those that haven't any rough spots on them? Composition sticking in there?

MR. GEHLING: There is one here that has composition in the hole.

MR. CLARK: Is that rough?

MR. GEHLING: No.

MR. CLARK: Would that do it, Mr. Lumbeck? A little composition sticking there sort of retard the current?

MR. LUMBECK: I don't think so, because that is a corrugated

spindle that they go on there, and there are probably about 70 corrugations in there, and it would be almost impossible not to get a contact at some point on there. There is some composition in quite a good many of them.

MR. CLARK: Do you use rubber-covered racks?

MR. LUMBECK: Yes.

MR. CLARK: I find some of those are loose, have a loose contact on them.

MR. GEHLING: Well, this stuff sliding through your solution, coming out of here, dry, wouldn't that have an effect to dirty your tank quickly?

MR. LUMBECK: Undoubtedly it would.

MR. GEHLING: Now, another question on these is, what makes some nickel deposits so much whiter than others? Some have a yellow cast, others are silver white.

MR. LUMBECK: In that particular case, I wasn't speaking of my own. My color is continuous all the time, but I do see other work from other places sometimes, that we get hold of, fixtures on which the nickel seems to have a whiter appearance.

MR. CLARK: I have two tanks—one has 95 per cent anodes in it, the other has the 99 per cent plus. Out of the old anodes, 95 per cent, the work is a great deal whiter.

MR. LUMBECK: I am being more convinced all the time.

MR. CLARK: I plate it 15 minutes, and it comes out beautiful, even iron work.

MR. LEDIG: I don't know if any of you boys have had a visit from the Harkshaw people lately or not about the anode they are bringing out.

MR. LUMBECK: I had a communication from them, but haven't seen any representatives.

MR. LEDIG: That is, I think, an admission of the manufacturers that the depolarized anodes are not what they claim for them. There is one of the concerns that were leaders in depolarized anodes, one of the originators if I am not mistaken, and they admit their weakness now by coming out with something they are boosting to the skies and above anything that has ever been on the market.

MR. GEHLING: Has anybody ever taken the time to find out, taking the same solution, with the same anodes, and using different current densities as getting the color?

You see, there is a certain range in plating nickel where nickel will leave a yellow cast, and the funny thing about it is that you can go below that range and it will be white, and above that range and it will be white.

MR. LEDIG: They tell you with the depolarized anodes you need

larger current density, and that in itself is a weakness, in my opinion.

MR. GEHLING: The current density of the deposit affects the color as much as it does the brittleness.

MR. HIRSCH: Another thing, ammonium salts will make that yellow. You take work and plate it with the same current density in a nickel solution free of ammonium salts, and that nickel will be much whiter than one that contains ammonium salts.

MR. GEHLING: On the other hand, if you get too much sulphuric acid above a crertain pH, you will get it yellow, and a real dark brown color with it.

Is there anything else on that? If not, we will go on to the next thing. Now we have an escutcheon here that we will pass around; that is all polished bright, hung on a rack, and stuck in a cleaner tank, with reversed current. The question is, what deposit is on the escutcheon. (Passed around specimen.)

While the boys are looking over this sample and forming an opinion, Mr. Massacotte has brought an old plate in. (Shows plate.) I don't know how many of the boys looked at it lying here, but we will pass it around. Now this goes to show you don't need a designer, you can hang it in your solution and reproduce that. And while not much of this work is done outside of the electro-forming business—their line is a little bit different—it is interesting for some of the members to look at. If some of the fellows get a little time on their hands, they might like to play with that.

I don't know, I am trying to express a thought here, in this respect. I know when Mr. Massacotte and myself were young fellows in this game, that as platers we always found time to do some monkeying. I don't know whether the younger platers today don't have the time to monkey or whether they haven't the ambition to do the monkeying, but anyway, I know there was one time when if we saw a nice design of a brooch or something, we would borrow the brooch and take an impression in wax, we would make one on a copper deposit, and finish it up to look like the original. I have my youngster's first shoe, that I took down to the shop and silverplated. You don't see any fellows trying to silverplate those things today.

Now you want to look at it, as young fellows, this way: Take the radio game, that has grown up to the extent it has. How did it get its start there? It grew up because there were so many amateurs, and every amateur was developing something different. You could go all over the country and you would not find two hook-ups alike; every fellow had something different. But finally some good developed out of that.

In chromium alone there is lots of room for development, so I think it is a good idea to monkey, just as we said in our talk last month, we never know what is before us. So don't forget that while you are professionals, don't forget you can also be amateurs, and it is the amateur who generally accomplishes the most in the long run. Now

you want to think you are amateurs, and start to do some delving into something, and it doesn't take long when you put a lot of stuff together, to arrive as something.

We are amateurs now in trying to analyze our solutions and tell what is in them and define them. Now that is a big start. We agreed that we were amateurs, but it took a lot of us old-timers to be the amateurs, and that is wrong; we should have more of the young fellows be the amateurs. That is what counts. The young fellows with the vitality and energy and ambition. They are going to accomplish twice as much as these old-timers. So I think that the young fellows of today ought to get out and show that along amateur lines they can accomplish twice as much as us old-timers did when we were amateurs.

MR. LUMBECK: Mr. Gehling, I believe one drawback to the thing you are speaking of is this infernal rush production. When you and I were boys, we had an opportunity to do something.

MR. GEHLING: Now that the escutcheon has been all the way across the room, what is the answer? The question is, what is that deposit and formation on that piece?

MR. CLARK: I think that it is the copper and zinc coming out of there.

MR. REYNOLDS: Mostly zinc.

MR. HIRSCH: I don't think so. I think that comes out of the cleaner. For instance, if you use Wyandotte electric cleaner, you can get a lot of junk like that on there, and it is probably aluminum in a solution like Wyandotte, which has Fuller's earth, which contains a lot of aluminum in there. The principle of Wyandotte, they claim, is to put some inert matter in there to carry the dirt to the bottom of it, and that matter contains a certain amount of aluminum which deposits on that work in electric cleaning.

MR. LUMBECK: That isn't a deposit, that comes only from a reverse.

This piece was in five seconds, and it doesn't make any difference whether it might be Wyandotte, or numerous other cleaners. I have tried various ones, and on anything over three seconds we get it.

MR. HIRSCH: Is there any lead in that cleaner?

MR. LUMBECK: Not that I know of.

If you stay over three seconds, it starts. From that on up, if you stay long enough, the whole thing will have that sort of green corrosion all over it.

QUESTION: I had the same trouble one time, and I threw out the cleaner and made up a new one. I used, I think it was cyanide or something in the cleaner, that did it. That is not a deposit, that draws out of the metal, and I must have gotten cyanide or something in the cleaner, so I threw it out.

MR. BASCH: Is there anything else outside of brass in that?

MR. LUMBECK: No.

The composition is about 60 per cent copper, 20 per cent zinc, and I don't remember just what the other portions are. It is a nice yellow.

QUESTION: Do you ever use cyanide in your cleaner?

MR. LUMBECK: I can get that from a brand new cleaner. I put a new one in every Saturday noon, and I can do the same thing Monday morning.

MR. GEHLING: Did you ever have that occur on your anodes in your brass solutions or copper solutions?

MR. LUMBECK: Yes.

MR. GEHLING: What do you think you are using this stuff as? That is used as anode, isn't it? You have got reverse current. And when the solution isn't in there to properly take off the deposit even, you get your anode coated up.

MR. GEHLING: You take a brass anode and you hang one brass anode in a tank, and you overload that tank at your cathode, maybe three or four times as big as that, and start to plate with all the current you have, 12 volts, how long do you think that brass anode will stay clean?

MR. LUMBECK: That is true.

MR. LEDIG: I will say this. If you put two steel anodes in that tank, and you hung a row of these things in there, put the reverse on them, you will get an absolute zinc coating on those anodes, and you are taking it right out of this thing here.

Cut your tank out and hang two small sheets in there, and you will get better results and not pull the zinc out.

MR. LUMBECK: I will say I am not having much trouble on that; I did it on purpose to find out, but if it were necessary for me to clean, which I know some people do clean on the reverse, it would be impossible. I can't do it with my work. I use reverse, but just barely hit it, just a fraction of a second.

MR. LEDIG: We clean our work in a boiling solution. We have a reverse tank there, too, and in our electric cleaner we put cyanide in there purposely, and deposit it on there as a cathode and remove every particle of it on the reverse to show the work is absolutely clean.

MR. BASCH: If Mr. Lumbeck wants to prove that is zinc, he can take one of those in a beaker and use straight caustic to clean it with, run it possibly a minute, and then check your solution to zinc, and you will find very high zinc content there.

MR. GEHLING: Now we will take up that lacquer propostion. One of our members states he has trouble with lacquer. It doesn't look bad when it goes out, but after it gets out, the work turns black in spots, like a fly speck, or a little streak here and there, and this shows up more quickly on silver plated finishes, lacquer can also be peeled in spots, making it necessary for the job to be returned and be re-

finished, the plating seems to be all right, as when refinishing it is only necessary to remove the lacquer and then rescratch brush or polish as the case may be and then relacquer. Has anybody any suggestions to offer on how to overcome these troubles, to keep from peeling on silverplated work?

MR. MASSACOTTE: While I don't agree with the lacquer, he being a nice gentleman and all that, but he uses lacquer like castor oil, very thick, and takes a chain for instance, and he will dip them and then when they are dry, they are like a stick, they will stay stiff, and he will break them all up. Naturally, with that thick lacquer, when it breaks after it is dry, it will make a mark and tarnish. I tell him that to my way of thinking he ought to have thin lacquer for the chain, but he uses the same for everything. They use thinner to rinse off the work before it goes in the lacquer to get out any sawdust that might be inside the tube, because some of those arms are bent at such a sharp angle, and they want to be sure there will be nothing in there detrimental to the lacquer. And for all that, the work will be just like fly specks and so forth. Not all over it—some parts of it; but others you would think there was never any lacquer there.

MR. SNYDER: Did the work come out on dip the same as sprayed? If the trouble was on sprayed work it may not be the lacquer. Then you have to look to your mechanical part. In other words, you have to look to see if the work is heated properly. You can have the air coming out of the gun—in some places the air can be too moist, the work can be clammy, when it goes on that way, the lacquer won't hold, and won't do it any good, because the moisture will start to work underneath and lift the lacquer in spots so you can scrape the lacquer off. Then if you have the lacquer too dry, it will come out and make a matted surface on top of the work like sandpaper. I don't think he does either one of them. It may be that he would have to dry his air or filter his air. He can take a piece of three-eighths inch pipe, air pipe, and run it through a two-inch line of steam pipe, which would dry or warm the air while he is using it. That would eliminate some of it, but it wouldn't eliminate the black spots. The black spots may be oil in that air line, if it comes any distance. It could be dust accumulated with that oil, and that would appear and be like brown rings that come around that spot. Those things can all be diagnosed to see what they are.

MR. LEDIG: Does he use the same lacquer on various pieces of work?

MR. MASSACOTTE: Well, he only has two ways of doing it, the spray and the dip.

MR. LEDIG: He ought to have three tanks. One sprayer will do, but he needs three tanks. If he puts a small condenser in there that he runs the air through it will stop that.

MR. GEHLING: You ought to have an oil filter in there, too.

If there are no objections, we will turn the meeting over to President Lumbeck.

THE EDWARD WESTON FELLOWSHIP IN ELECTRO-CHEMISTRY AND THE EDWARD GOODRICH ACHESON GOLD MEDAL AND PRIZE

Dr. E. B. Sanigar, the first Weston fellow of the American Electrochemical Society, expects to complete his work by late summer. To date nine students have applied for the fellowship for the ensuing year and further applications may be made through the secretary, Dr. Colin G. Fink, prior to the spring meeting of the Society at St. Louis, May 29th to 31st. Announcement of the successful candidate will be made sometime in June.

The first recipient of the Acheson gold medal and one thousand dollar ($1,000) cash award was its founder, Dr. Edward Goodrich Acheson. Dr. Acheson returned the one thousand dollar cash award to the Society but retained the medal which, it is stated, he treasures very highly. No further award will be made until the fall of 1931.

A. K. GRAHAM.

PHILADELPHIA BRANCH

Philadelphia Branch held their monthly meeting April 4th at the U. of P., Vice-President S. T. Lumbeck presiding.

After the regular order of business, Mr. Geo. B. Hogaboom gave an interesting talk on black nickel formulas. This was put forth as George knows how and was much appreciated as shown by the spontaneous applause at the conclusion of his talk. By request this talk will not be published in the Review. Mr. Albert Hirsch, who represented the branch at the Newark conference, made a tentative report of the conference.

PHILIP UHL, Secretary.

MILWAUKEE BRANCH

Milwaukee Branch held a very interesting meeting, March 13th. The research conference, and the coming convention were discussed. The report of the committee in charge of our banquet and educational session on April 26th at the New Schroeder Hotel was very promising. Henry Binder, in charge of the afternoon educational program, gave a very good report. The program is almost completed and further notice will be given when program is complete.

At Milwaukee Branch meeting last night, H. Binder, the chairman of th Program Committee for the educational session and banquet, April 26th, announced the afternoon program as follows:

(1) Plating Room Engineering, by P. J. Lyons; courtesy of Hanson-Van Winkle Munning Co.

(2) Chromium Plating on a Large Commercial Scale in Modern Production, by Jacob Hay.

(3) Electroplating on Aluminum, by Harold K. Work; Harold K. Work Aluminum Research Laboratories.

(4) Round Table Talk and Discussions (with slides), by Fred Liscomb; courtesy Hanson-Van Winkle Munning Co.

(5) Hydrogen Pitting and Peeling in Nickel and Copper Cyanide Solutions, by Chas. Proctor; courtesy of Roessler & Hasslacher Chemical Co.

(6) Lacquering, by Ed H. Bucy; courtesy Brevolite Co.

E. WERNER, Secretary.

HARTFORD-CONNECTICUT VALLEY BRANCH

The Hartford-Connecticut Valley Branch A. E. S. held its regular monthly meeting at the Hartford Chamber of Commerce, 805 Main street, Hartford, Conn., Monday evening, March 24, 1930. The meeting was called to order at 8:30 p. m., with President Beloin in the chair. Minutes of the previous meeting were read and accepted. A communication from President Smith was read and placed on file.

Chairmen of the various committees reported progress in the arrangements for our annual banquet to be held on Saturday, May 10, at the Hotel Bond, Hartford, Conn. A fine Educational Session is promised.

It was voted to allow the Secretary to expend a reasonable amount for assistance in the distribution of tickets and programs. Our banquet this year is to be conducted without the help of paid advertisements.

Having no speaker for the evening, Mr. W. J. Kennedy gave a very interesting half-hour talk on what took place at the Powers Hotel at a meeting of the Rochester Branch on Saturday, March 22. The rest of the evening was spent in discussion on plating problems, one in particular, that of stripping nickel deposits from steel without injury to the steel, caused much discussion. One member claimed good, quick results by using a sulphuric acid strip run at about 180° F., with a bi-reading of 1300. The strip was operated at a 6-volt pressure, a reverse current used; the tank was operated with the nickel plated steel as the anode and either lead or copper strips used as the cathode. A small amount of glycerine was used in the acid strip.

President Beloin brought a box of cigars, which were enjoyed by the seventeen members and visitors present. The meeting was adjourned at 10:30 p. m.

V. E. GRANT, Secretary.

NEW YORK BRANCH

The regular monthly meeting of the New York Branch A. E. S. was held Friday, February 28, 1930, at the World Building, Park Row,

New York City. The meeting was called to order at 8:30 o'clock, with President F. Haushalter presiding. All officers were present and the minutes of the previous meeting were approved as read.

There are so many applications coming in it keeps the Investigating Committee busy through the whole meeting checking upon them.

Chairman of the Banquet Committee, Mr. Mac Stocker, reports that our banquet on February 15, 1930, was a success.

Meeting was duly adjourned at 11:30 o'clock.

The regular monthly meeting of the New York Branch A. E. S. was held Friday, March 14, 1930, at the World Building, Park Row, New York City. Meeting was called to order, with President F. Haushalter presiding, and all officers present. The minutes of the previous meeting were approved as read.

There was not many members present at this meeting, but due to all the discussions on advertising, Dr. Pan's charts on simplified methods of control, and appointing our delegate to the research meeting in Rochester on March 22, 1930, it was midnight when the meeting was adjourned.

In answer to many inquiries we have had, we wish to advise that the New York Branch now have ready for distribution to all the branches requesting same, the original charts as compiled by Dr. Pan with a supplementary chart to go with First Edition, bringing up-to-date what is considered by any and all those in a position to judge, the simplest, most complete and concise method of Chemical Control of Electro-Plating Solutions to be had at the present time. Work worthy of the author who has given much of his time and talent in the past seven years to problems and research relative to Electro-Plating. Well worth the perusal, consideration and practice of all Electro-Platers looking toward efficiency in the control of their solutions. A method of control strongly advocated by the New York Branch who have, with the consent of the author and with all rights reserved by the author and the New York Branch, take it upon themselves to distribute the charts to the various branches.

The combined charts may be had at the price of $3.00, plus postage, by applying to the Secretary of the New York Branch, Mr. John E. Sterling, 2581 Forty-sixth street, Astoria, Long Island, N. Y.; it consists of 30 pages, including 22 charts, and is 11 by 8½ inches in size.

CHAS. HAUSHALTER, Recording Secretary.

LOS ANGELES BRANCH

The first annual banquet was held March 15, and though we had very hard rains and hail storms, and what have you, during the day and evening, the ardor of members and guests was not dampened.

The afternoon Educational Session was well attended and the following papers were enthusiastically received.

The following speakers presented papers or spoke on important topics relating to the Electro-Plating industry:

The Los Angeles Branch Present and Future, by M. D. Rynkofs.

A Message from the Founder, C. H. Proctor; courtesy of E. Lamoureux of Chicago Branch.

Talking Pictures and Electro-Plating, by T. H. McClain of the Pathe Record Co.

Chemistry and Electro-Plating, by A. A. Bissiri, B. S., M. A.

Progress and Benefits of Standards, by J. A. Maurer, B. S., Chemist at Edison Elec. App. Co.

The Protective Value of Chromium Plating and Its Throwing Power, by W. P. Barrows, Research Associate at the Bureau of Standards, Washington, D. C.; courtesy of Eugene D. Bedwell.

Overcoming Spotting Out With Water-Dip Lacquer, by R. J. Hazucha; courtesy of G. D. Magnus.

Principles of Cleaning, by E. W. Heil, Coleman Lamp Co., Wichita, Kans.; courtesy of Frank C. Rushton.

Summary of Research on Electro-Plating, by Dr. William Blum of the Bureau of Standards, Washington, D. C.; courtesy of E. Lamoureux of Chicago Branch.

Question Box Forum, by Charles A. Russill.

The banquet was more than a success, if one were to judge by the laughter, smiling faces, dancing and card games in which everyone indulged.

The exhibits were good and well taken. Chromium plating predominating; O'Keefe-Merritt Mfg. Co. and Pacific Gas Radiator Co., manufacturers of the best gas stoves on the coast, exhibited their best gas heaters and both companies donated same to the branch. These were given away. Needless to say, the branch certainly appreciates the spirit shown by their extreme kindness. Mr. George Nickols received the first stove, while the Secretary was perfectly satisfied with the second one, even though he arranged the contest extemporaneously.

A number of the ladies wanted to know if we intended to have a banquet once a month.

Considerable credit is due to Geo. Kyle, chairman; Clarence Thornton and Ernie Lamoureux for giving the time they did to make the affair a success.

The regular monthly meeting of this branch was held as usual at the Elite, April 9, 1930. The meeting was called to order at 7 p. m., President C. E. Thornton presiding.

Considering the first meeting after the banquet and the strong attitude toward the Chemistry Class, the attendance was very good. Thirty-seven members were present.

Minutes of the previous meeting were read and approved. All bills were voted paid. Communications were read and noted.

Three new members were elected and seven applications for membership were presented by the Board of Managers. This will bring the membership up to ninety-two.

We had no prominent speaker for the evening but plenty of members capable of giving their invaluable views on several subjects that no plater should have missed. The meeting was plenty hot, adjourning at 11 o'clock.

M. D. RYNKOFS, Secy.-Treas.

ROCHESTER BRANCH

Rochester Branch held their monthly meeting on the second Friday of the month on account of the research meeting and banquet that will be held here this week, Saturday, March 22.

President Reama is pleased with the spirit of co-operation and the attendance at our meeting, which is the best Rochester Branch has had in years.

The boys had a real surprise when Mr. Raymond Lopez entered the meeting room; he has been very sick but is well on the road to recovery. Mr. Lopez will take an active part in our meeting and banquet.

The following committee will have charge of our eighteenth annual banquet:

Hotel Arrangements—Raymond Lopez.

Flowers and Favors—Harry C. Puffer.

Reception—Chas. Puffer, P. A. Lyons, J. R. Elster.

Radio—Wm. Hart, J. W. Snyder, Frank Mesek, J. R. Elster.

Publicity and Entertainment—Chas. Griffin, Clarence Reama, S. P. Gartland, Chas. Hehr, F. J. Kohlmeier, Gerald A. Lux, Wm. Hart.

Music will be by the Melody Boys' Orchestra, with Mr. Eli J. Beaudry in charge.

Everything is ready for the largest and best banquet of Rochester Branch.

CHARLES GRIFFIN, Secy.-Treas.

WATERBURY BRANCH

About seventy-five members and friends of the A. E. S., including delegations from the Bridgeport and Hartford Branches, attended the last meeting of Waterbury Branch. Mr. E. L. Wood, metallurgist of Landers, Krary & Clark, New Britain, was the attraction, taking for his topic, "The Elements of Chemistry," and the "Analyzing of Nickel

Solutions." With the aid of blackboard and laboratory instruments, the speaker held his audience close on to two hours, every minute proving interesting and instructive. A social session followed the answering of questions. Refreshments were served. The committee in charge consisting of Messrs. Gray, Cavanaugh, Tice, Miller, Muscio and Delage, received the compliments of all present for the pleasant evening.

An application for active membership was received from Andrew Perrin of the Chase Mfg. Co.

A change has been made in the night and place of meeting. Hereafter meetings will be held on the second Friday of the month in Engineers Hall, 11 East Main street.

The second meeting of Waterbury Branch in its new meeting place, Engineers Hall, East Main street, was well attended, about seventy-five per cent of the membership being present. The principal part of the session was given over to the presenting and answering of questions, which were many and varied. A number of samples, the finish and method of obtaining same being of a doubtful nature, were passed around, and interesting opinions were offered by many. Instructive remarks on the subject of "Ball Rolling" were given by Past President William Gray. Ellsworth Candee gave a report on the meeting of the Research Committee held in Rochester, N. Y.

The plating of automobile parts was a discussion that many present entered into, and some of the remarks that ensued were not any too complimentary for the plating work done in some of the owners' cars. Further report from same is looked for after the April showers. President Muscio appointed a committee to arrange for a big meeting on the night of our next session in May. It will be well worth attending, and a large audience is looked for.

WM. F. GUILFOILE, Secretary.

ST. LOUIS BRANCH

Regular meeting of St. Louis Branch was held on Friday, March 14, at the Central Y. M. C. A., at which time a dinner was served. After enjoying the frog legs and the apple pie a la mode, meeting was called to order by President A. Reifling. Minutes of previous meeting were read and approved. In the minutes it was stated that the chairman of the banquet be given a rising vote of thanks and reappointed for next year.

In the absence of Mr. Seimer, Dr. L. Stout of Washington University was appointed librarian, and he gave a very interesting talk, told of some of his experience, some in regard to cadmium and some chrome plating. After answering questions to satisfy all, meeting adjourned.

CHAS. T. McGINLEY, Secretary.

APPLICATIONS

	Branch
Wm. Tuttle	Newark
Chas. Whitehead	Newark
Chas. W. Neld	Newark
Samuel Geffon, 1821 Bryant Ave., N. Y. City	New York
Max Weiss, 415 Putnam Ave., Brooklyn, N. Y	New York
Gustave Mallow, 868 Fox St., N. Y. City	New York
Daniel Castle, 544 Willoughby Ave., Brooklyn, N. Y	New York
Peter P. Lucas, 5520 Eighth Ave., Brooklyn, N. Y	New York
Maurice W. Spinalo, 51 E. 125th St., N. Y. City	New York
N. E. Brewerton, 721 N. W. 23rd Ave., Miami, Fla	New York
Earl E. Ashby, Zapon Co	Hart.-Conn. Valley
Bert Wm. Sage	Newark
Ralph H. McCahan, Hanson-Van Winkle-Munning Co., Cleveland, Ohio	Cleveland
John B. Figliozzi, 2129 85th St., Brooklyn, N. Y	New York
Daniel E. Castle, 544 Willoughby Ave., Brooklyn, N. Y	New York
John L. Roberts, Jr., Manheim Apts., B-1 Queen Lane, Germantown, Philadelphia, Pa.	Philadelphia
J. F. Moore, 2146 Sangier St., Philadelphia, Pa	Philadelphia
Anthony S. Arcuri, 4913 Cortez St., Chicago, Ill	Chicago
E. A. Woelfel, Western Clock Co., La Salle, Ill	Chicago
Jack Curry, 1317 N. 17th Ave., Melrose Park	Chicago
Wyley Monroe, Grand Hotel, Broadway, Rockford, Ill	Chicago

ELECTIONS

	Branch
Chas. Coply, 6 Stewart Ave., Nutley, N. J	Newark
Shegi Furucui, 13 Ebiye-Shimot Z. Chome, Nishi Yodgawa, Osaka, Japan	Newark
Hy. Wenerman, 347 Hillside Ave., Newark, N. J	Newark
C. H. Hastie, care Westinghouse Mfg. Co., Chicopee Falls, Mass.	Hart.-Conn. Valley
Jos. Bedo, 2828 E. 122nd St., Cleveland, Ohio	Cleveland
Adolf Gress, R. F. D., Young St., Ypsilanti, Mich	Detroit
C. L. Herdman, 201 E. Ward St., Urbana, Ohio	Dayton
C. G. Spence, 528 E. 15th St., Los Angeles, Calif	Los Angeles
August Zeida, P. O. Box 98, Vaux Hall, N. J	Newark
John Miller, 925 Broad St., Elizabeth, N. J	Newark
Jos. Maurer, 64 Eaton Pl., E. Orange, N. J	Newark
Ed McLaughlin, 381½ Springfield Ave., Newark, N. J	Newark
Ed Stemback, 75 N. 14th St., E. Orange, N. J	Newark
Harry Carlin, 2201 Haviland Ave., N. Y. City	New York
Mark Weisberg, 43 Hospital St., Providence, R. I	Prov.-Attleboro
P. J. O'Malley, 1228 Furnace Brook Pkwy., W. Quincy, Mass	Boston
M. S. Katziff, 11 Sea Foam Ave., Winthrop, Mass	Boston
Wm. J. Sproule, 6½ Habnis St., Nashu, N. H	Boston

Chas. T. Campbell, Boston Nickel Plating Co., Boston, Mass...Boston
Allen S. Moore, 1326 Elm St., Lebanon, Pa.....Philadelphia
John L. Patterson, 989 Carver St., Philadelphia, Pa.....Philadelphia
Jos. Maushard, Peoria, Ill.....Chicago
Jos. G. Sterling, 3007 S. Kolin Ave., Chicago, Ill.....Chicago
Ed. J. Ryan, 2717 Emerald Ave., Chicago, Ill.....Chicago
Jess Barnes, 217 W. Illinois St., Chicago, Ill.....Chicago

RESIGNED

	Branch
Jay A. Warner, R. F. D. No. 2, Box 3155	Detroit

DEATHS

	Branch
M. D. Lovatto	St. Louis
M. F. Brunner	Cincinnati

TRANSFERS

	Branch
J. J. Basch, from Newark to	Philadelphia

SUSPENSIONS

	Branch
J. Duncan, Newago, Mich	Chicago
T. Harell, 209 W. 23rd Pl., Chicago, Ill	Chicago
J. Jones, 422 N. Foley Ave., Freeport, Ill	Chicago
Z. Plummer, 5500 Northcliff Ave., Cleveland, Ohio	Chicago
P. Spizziri, 2246 W. Harrison St., Chicago, Ill	Chicago
Wm. Schleip, 2259 N. Mead Ave., Chicago, Ill	Chicago

SUSPENDED

	Branch
John M. Grubler, 3211 Colgate St., Baltimore, Md	Balt.-Wash.
H. R. Burke, Garland A. A. County, Md	Balt.-Wash.
F. L. Abell, 2267 E. Erie Ave., Lorain, Ohio	Cleveland
P. H. Frank, 2314 Amesbury Ave., Cleveland, Ohio	Cleveland
Wm. N. Henderson, 3039 14th St., Detroit, Mich	Indianapolis
Milton Lord, 10 Coyle Ave., Pawtucket, R. I	Prov.-Attle.
Robert F. Crook, 25 Dean St., Attleboro, Mass	Prov.-Attle.
Raymond McCarthy, 87 Holman St., Attleboro, Mass	Prov.-Attle.
T. H. Nolan, 82 Williams St., Fairhaven, Mass	Prov.-Attle.
W. S. Chipman, Cincinnati, Ohio	Cincinnati
John Brunss, 1329 Main St., Cincinnati, Ohio	Cincinnati
C. Ditmar, Cincinnati, Ohio	Cincinnati
T. A. Elwin, Cincinnati, Ohio	Cincinnati

NAMES AND ADDRESSES OF FOREMEN PLATERS ELECTED TO THE LOS ANGELES BRANCH, MARCH 12, 1930

O. E. Hollinger.....825 S. Euclid Ave., Ontario, Cal.
R. Buchanan.....2124½ S. Vermont Ave., Los Angeles, Cal.
H. Garside.....2229 W. 78th St., Inglewood, Cal.
O. Johnson.....961 McBride St., Los Angeles, Cal.
H. E. Randall.....Box 614, Culver City, Cal.
J. A. Shulman.....6639 Lexington Ave., Hollywood, Cal.
C. D. McTevia.....1117 Fremont Ave., S. Pasadena, Cal.
F. T. De Tray.....129 W. 66th St., Los Angeles, Cal.
A. Regmunt.....3815 E. 61st St., Huntington Park, Cal.
Wm. F. Schultheis.....6213 Templeton St., Huntington Park, Cal.
Leo Atimion.....2722 W. 75th St., Los Angeles, Cal.
Wm. Kreitzer.....720½ W. 59th St., Los Angeles, Cal.
W. A. Schuler.....4063 La Salle St., Culver City, Cal.
Albert J. Lupien.....114 Sansome St., San Francisco, Cal.
Max Golden.....228 N. St. Louis St., Los Angeles, Cal.
T. H. McClain.....428 N. Louise St., Los Angeles, Cal.
H. G. Hartman.....1431 S. Woods Ave., Los Angeles, Cal.

APPLICATIONS

Lea Roy Miller.....1358 S. Flower St., Los Angeles
Chas. H. Houston.....649 Court St., San Bernardino, Cal.
Geo. H. Bartlett.....3518 E. Second St., Los Angeles

ELECTED MEMBERS

Leo Roy Miller.....1358 S. Flower St., Los Angeles
Chas. H. Houston.....649 Court St., San Fernardino, Cal.
Geo. H. Bartlett.....3518 E. 2nd St., Los Angeles

APPLICATIONS

Wesley W. Wentz.....5300 Van Ness Ave., Los Angeles
Louis Delamothe.....517 18th St., Oakland, Cal.
Robert Lewis.....1100 W. 73rd St., Los Angeles
Walter Hestrup.....R. 1, Box 1120, Downey, Cal.
G. Allen Williams.....4921 Lincoln Ave., Los Angeles
John F. Fleckenstein.....Box 941 Main Office, Los Angeles
LeRoy E. Watt.....528 E. 15th St., Los Angeles

ELECTIONS

	Branch
Max Weiss, 415 Putnam Ave., Brooklyn, N. Y.	New York
Frank Miltner, P. O. Box 497, Lindenhurst, L. I., N. Y.	New York
Samuel Goldstein, 3215 Hull Ave., New York, N. Y.	New York
Samuel Gordon, 2822 East 7th St., Brighton Beach, Brooklyn, N. Y.	New York
Emanuel Cohan, 122 Centre St., New York, N. Y.	New York

BALTIMORE-WASHINGTON

Meets in Enoch Pratt Library, Calhoun and Hollins Sts. Geo. F. Turner, Secretary, 5324 Maple Ave., Pimlico, Baltimore, Md.

BOSTON

Meets at American House, Boston, Mass. First Thursday each month. Secretary Thos. Johnson, 41 first St., South Boston, Mass.

BRIDGEPORT

Meets first and third Friday of each month at Chamber of Commerce Rooms, Stratfield Hotel. Secretary, Wm. Ehrencrona, Box 301, R. F. D. No. 1., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., Atlantic Hotel, 316 S. Clark St. Secretary, J. C. Kretschmer, 1914 Warner Ave.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, Al. Yeager, 2021 Sherman Ave., Norwood, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. H. Terdoest, 380 Pioneer Ave., Akron, Ohio.

HARTFORD-CONN. VALLEY

Meets fourth Monday in each month alternately at 266 Pearl St., Hartford, Conn., and corner Broadway and Worthington St., Springfield. Secretary, Vernon Grant, 43 Putnam St., Bristol, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Robert G. Suman. 2734 Ridge Road, Dayton, Ohio.

DETROIT

Meets the first Friday of each month at the Hotel Statler, Louis II Room, Detroit. Secretary, Chas. Phillips, 13421 Camden Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Friday of each month at 528 Lake Michigan Drive, N. W. Secretary, Jacob Van Dyke, 1361 Union Ave., N. E., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

LOS ANGELES

Meets second Wednesday of each month at the Elite, 633 E. Flower St., Los Angeles, Calif. Secretary, M. D. Rynkofs, 1354 W. 25th St., Los Angeles, Calif.

MILWAUKEE

Meets second and fourth Thursdays of each month at Cor. 3rd St. and Highland Ave. J. N. Hock, 1229 W. 24th St., Milwaukee, Wis.

MONTREAL

Meets last Friday of month at Office of Secretary, John H. Feelay, 411 Aylmer St., Montreal, Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at Franklin Hall, 41 Franklin St., Newark, N. J., at 8 p. m. Secretary-Treasurer, Geo. Rueter, P. O. Box 201, Newark, N. J.

NEW YORK

Meets every second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary-Treasurer, J. E. Sterling, 2581 46th St., Astoria, L. I.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Friday of each month at 8 p. m., at downtown branch, Y. M. C. A. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 44 Washington St., Prov. Engineers Rooms, Providence, R. I. Secretary, J. H. Andrews, 19 Rosedale St., Providence, R. I.

ROCHESTER

Meets every third Friday of each month at the Powers Hotel. Secretary, Chas. Griffin, 24 Garson Ave., Rochester, N. Y.

ST. LOUIS

Meets second Friday of each month at Central Y. M. C. A., 16th and Locust St. Secretary, C. T. McGinley, 8214 Fairham Ave., University City, Mo.

TOLEDO

Meets first Thursday of each month at Toledo Secor Hotel, corner Cherry and Page Sts. Secretary, L. D. Cope, 3747 Grantley Rd., Toledo, O.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Secretary, H. W. Graham, 102 Robina Ave., Toronto, Canada.

WATERBURY

Meets the second Friday of the month at Engineers Hall, No. 11 East Main Street. Wm. F. Guilfoile, secretary, P. O. Box 961, Waterbury, Conn.

WORCESTER

Meets Directors' Room, Chamber of Commerce, Worcester, Mass. Roger H. Bryant, Secretary, 94 Grove St., Worcester, Mass.